U.S. CONSUMER PRODUCT SAFETY COMMISSION

CHAIRMAN'S CONFERENCE ON NIGHTTIME BICYCLE SAFETY

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4330 East-West Highway
Bethesda, Maryland

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Mr. David Willis, Executive Director
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CHAIRMAN BROWN: I think I'll stand up here just so I can be heard. I'm Ann Brown, and I'm Chairman of the Consumer Product Safety Commission. I can't see you over here, so let me give you a wave and say good morning.

A PARTICIPANT: Good morning.

CHAIRMAN BROWN: Can you hear me better -- how is it from here?

A PARTICIPANT: It's okay. Fine. The mike you can take away from the podium.

CHAIRMAN BROWN: I can get hooked up if I want it, too.

A PARTICIPANT: Just pull the mike out.

CHAIRMAN BROWN: Now, you know, who do I feel like? Who's that guy that goes up and down the aisles?

A PARTICIPANT: Phil Donohue.

(Laughter)

CHAIRMAN BROWN: That's right. Tell me your question, Mike.

(Laughter)

CHAIRMAN BROWN: I want to welcome all of you here today. This is a very, very important topic. Bicycling and bicycling accidents couldn't be a more important topic for the Consumer Product Safety Commission, and we are charged with keeping kids and adults safe from injury and death. And that's what we have to do in this very important conference on nighttime bicycle safety.

Under my chairmanship you know this agency is and has become an activist agency, and we are anxious to pursue solutions to hazards associated with consumer products.

This commission worked on bicycle safety way back when our doors first opened for business in 1973, and our activities have included in this mandatory and voluntary standards of both bike and helmet safety and consumer information about rider skill and behavior.

I guess I don't have to tell this group assembled here that bicycle riding is one of America's most popular sports. More than 67 million Americans ride bikes. But riding a bicycle has to be fun, and to be fun, it has to be safe. And it can be a risky business.

We are distressed that there are more injuries and deaths associated with bicycles than with almost any other single product under the CPSC's jurisdiction.

The CPSC study, Bicycle Use and Hazard Patterns in the United States, an excellent study, points out that bike- related injuries are the cause for about one-half million annual visits to hospital emergency rooms. There may be an estimated additional one-half million visits each year to doctors' offices and clinics. And of course, most tragically about 1000 people die each year in bicycle related accidents.

The statistics for nighttime bike riding are particularly grim. While only about 12 percent of bikers ride during non-daylight hours, more than one-third of the deaths occur during this time. And because of the disproportionate number of accidents during the hours of the night, of dawn and of dusk, it's essential that we here all come together to focus our efforts on improving nighttime bicycle safety.

I understand that you'll be discussing a number of options today. And while the CPSC study on bikes found no mechanical hazards that would warrant revisions to the existing mandatory standards for bikes, we are here, and I hope you are here also with an open mind.

Based on our discussions today, there may be reasons to reassess the section of the CPSC bicycle standard that deals with reflectors. It might be appropriate to consider the need for lights. Perhaps we should improve the information or training available for those who choose to ride at night.

Today's conference may be particularly timely given the recent Derby Cycle lawsuit. This lawsuit, as I'm sure you all are aware, resulted in a multi-million dollar settlement in favor of a youth who was hit by a Jeep when he was riding his bicycle at night without lights.

This may also be the appropriate time for me to reiterate our position on children and nighttime bicycle riding, and this is very important. And we are very firm on this. We believe that no children, under any circumstances should ride their bikes at night. Your discussion here today should focus on what we can do to make nighttime bicycle riding for adults a safe activity.

I'm pleased to see all of you, a group of experts in bicycle riding and safety gathered here today. I've been teaching one of my grandchildren to ride a bike, and

believe me, I need an expert's help.

I encourage you to put much creative energy into exploring practical and effective solutions to this very serious problem. And let me tell you, I understand that this is not a simple issue, and there are no simple fixes here. It's a complex issue, and we need to evaluate a range of options before we can determine the most effective course to take.

We from the CPSC are here to listen, to discuss and to act, and we want your best thoughts on how to ensure nighttime bicycle safety and what we can do as a federal regulatory agency to make that happen.

I particularly would like to thank Greg Rodgers, our bicycle project manager, for managing and arranging this conference and for the superb study that he has written, a truly landmark study. In addition, I would like to introduce one of my advisors, Nancy Sachs -- Nancy, just show who you are -- and Ron Medford who heads the Office of Hazard Identification and Reduction -- Ron right there. And Ron will moderate today's discussion.

I'll be dropping in and out from time to time. I have a couple of other things to do, but I want to be sure that I hear everything that happens at the conference. And I'm going to be joining you again at the conclusion of the conference, but I will be coming back and forth.

I wish you good luck with your discussions today. Everybody put their thinking caps on to see what we can do to come up with some real solid conclusions.

I'd also like to note our honored guest here, Commissioner Mary Gall, my fellow commissioner who just waved to us -- Mary over there. I tried to get her to come to the table but I did just want to introduce Mary to you because we have an excellent working relationship, and we're both very anxious to see what we can do about this problem of nighttime bicycle riding.

And now I'd like to turn it over to Ron Medford although I hate to give up this mike.

MR. MEDFORD: Thank you. Just a couple of pieces of information about how I thought we would operate this morning and into the afternoon. You see from the agenda that's in your folder that we've broken the meeting up into three sections,

two this morning and one in the afternoon.

What I'd like to do is wait until after each of the speakers in each of the sections has finished before we ask questions and open it up for discussion so that after the last discussion this morning at 9:55 on effective cycling at night, after that presentation we'll go ahead and have the discussion.

I'm first going to ask -- call on Greg Rodgers. Greg has been with the Consumer Product Safety Commission since 1982. He's an economist and the Director for Economic Analysis. He's been involved in a wide range of products while at CPSC, but, like the chairman said, for the last few years he's principally been involved in the bicycle project. And he's here this morning to talk about the study that he's finished.

PRESENTATION OF GREGORY RODGERS

CONSUMER PRODUCT SAFETY COMMISSION

MR. RODGERS: Good morning. I'd like to add my welcome to that of Chairman Brown and Ron Medford. I'm pleased that you've all been able to --

A PARTICIPANT: Can't hear you.

MR. RODGERS: Can't hear me?

A PARTICIPANT: Shout please.

CHAIRMAN BROWN: No, he won't have to shout. He'll use the mike.

MR. RODGERS: Is this working now? Does that work? Okay. It's working now.

A PARTICIPANT: Yes.

CHAIRMAN BROWN: There you go.

MR. RODGERS: Well, anyway, once again, I'm really pleased that you've all been able to attend because it's really your contributions that are going to make this meeting worthwhile, and I've already spoken with most everyone here today about our common concern, nighttime bicycle safety. And I can say that your input has greatly added to my understanding of the issue, and I'm looking forward to more of that today.

An estimated 300 to 350 bicyclists die every year of nighttime crashes. From a risk standpoint, the thing that's most striking about these data is that the nighttime

fatalities are disproportionate to the amount of riding time. Next slide. First slide, I guess. The next slide.

This slide breaks down fatal accidents and riding time, or exposure by time of day, and provides visual evidence of the high nighttime risks. It's based on data from the National Highway Traffic Safety Administration's fatal accident reporting system and from the Consumer Product Safety Commission's 1991 exposure survey.

As you can see by looking at the two pie charts, even though nighttime riding or exposure accounts for only about seven percent of riding, it accounts for about 35 percent of the deaths. And by applying some common statistical methods to these data, we can calculate the risk of death, that the risk of death from riding after dark is about seven and a half times the risk during the daylight hours. Next slide.

Now I would like to talk about some of the characteristics of the fatal accidents that happen after dark. Next slide.

First, like all bicyclist deaths, most nighttime deaths involve collisions with motor vehicles. Now the next several slides are going to illustrate the relationship between age and nighttime bicyclists' deaths.

The pie that is on the monitor right now shows that nighttime deaths represent a hazard faced predominantly by older adults -- I'm sorry -- by adults and older teenagers. About 86 percent of the nighttime deaths involve bicyclists age 15 and older. Next slide.

This bar chart shows the percentage of daylight and nighttime deaths for five different age groups. The dark blue portions of the bars represent the percentage of deaths that occur after dark, and as shown in the first column, only about 14 percent of the deaths of children under age 15 occurred after dark.

In contrast, the middle three bars show that for riders between the ages of 15 and 64 almost half of the deaths occur after dark, with the highest proportion associated with the 25 to 44 year-old age group. Next slide.

This bar chart shows the number of nighttime deaths per million riders for each of the age groups. As you can see, the nighttime fatality rate for children under age 15 was 1.5 deaths per million bicyclists. However, the rate soars to over six deaths per million riders for bicyclists between the ages of 15 and 64, and it rises even

further to almost 10 deaths per million riders for bicyclists over age 65. Next slide.

The findings by the gender of bicyclists killed at night are even more striking. This simple pie chart on the monitor shows that over 90 percent of the nighttime deaths involved males. Next slide.

This bar chart shows that the nighttime fatality rate for males is nearly 11 deaths per million male riders compared to less than one death per million bicyclists for female riders. Next slide.

I was also quite surprised to learn that a large proportion of the bicyclists that are killed have been drinking. In fact, almost a quarter of the bicyclists killed in 1991 had measurable blood alcohol concentration levels and 17 percent were considered intoxicated. Now this is the next slide, which shows information only on the deaths that occur after dark, which is even more striking than what I just said.

Of the bicyclists who are killed after dark, almost half had been drinking, and 38 percent, the group represented by the red, were considered intoxicated. So for the nighttime bicyclists, the nighttime bicyclists who are killed, alcohol was a very important problem.

Now the role of alcohol in accident scenarios is not really clear, but it's certainly an important factor that needs to be considered when evaluating strategies for reducing nighttime fatality risks. Next slide.

So what have we found out about nighttime fatal accidents? First, most involve collisions with motor vehicles. Second, most victims are adults and older teenagers. Third, most victims are males. And finally, alcohol is often involved. Next slide.

One of the most important topics that we'll be discussing today is bicycle lighting. We'll also get into reflectors and other technology used to make night riding safer.

I want to note right away that most bicycles in use are already equipped with reflectors required by the CPSC bicycle standard. However, only a small proportion of bicycles are actually equipped with either headlights or taillights. And we found this in our 1991 exposure survey of bicycle use patterns.

But what's even more striking is that this is even true for the approximately 12

percent of bicyclists who reported spending some time riding after dark. Less than a third of the bicyclists who rode after dark said they had equipped their bicycles with either a headlight or a taillight. And this is clearly one of the issues that we need to address today.

What I've said this morning is just an introduction to a much broader discussion that we're going to have over the next few hours. And over the next few hours we'll hear presentations on and discuss a number of vital issues concerning nighttime bicycle risks. These issues include nighttime riding hazards, effective cycling techniques for nighttime riding, the state of bicycle lighting and reflector technology and how these technologies can be applied to bicycles and policy implications.

And finally, I'd like to repeat what the chairman has already said, that we're here today to listen to you and to learn from you. And I feel very proud that we've been able to bring together such an impressive group of experts to help us deal with this major safety problem. Thank you.

MR. MEDFORD: Thank you, Greg. We're next going to hear from Mr. Martin Guttenplan. Mr. Guttenplan is the director of the Florida Bicycle-Pedestrian Commuter Center at the Florida State University. The center acts as a clearinghouse which provides information and assistance to employees and government agencies interested in setting up bicycle and pedestrian commuting programs across the state. So good morning, Mr. Guttenplan.

PRESENTATION OF MARTIN GUTTENPLAN
FLORIDA STATE UNIVERSITY

MR. GUTTENPLAN: Good morning. Can I have the first slides, please? First slide.

The one thing I want to get across here, I work closely with Dan Burden who is the state bicycle/pedestrian coordinator for Florida. And Dan has many years of expertise in this topic, and together we do a visibility section in our courses for bicycle facilities design and also for pedestrian facilities. And we pulled this out of a course that we just did this week down in Sarasota.

And for me to even pretend to be an expert on this subject would be an insult

because we have -- you know, there are researchers who have done the primary work right here in this room.

What I would like to do at the presentation is just to provide a brief overview of the visibility problem and how the mechanics of the eye work and just some of the things regarding visibility so that we have a common vocabulary, so to speak, on the table. And I hope this is helpful. Next slide, please.

As you can see, when we're in a situation like this with rain as well as nighttime conditions plus ambient light, it's kind of hard to pick out the two bicycles in there. And we'll go into the -- into some of the conditions leading up to this. Next slide, please.

The first thing is how does the eye actually work? Many of you already are familiar with this, but for those of you who aren't, the eye takes in light, and then it converts that light into electrical impulses. The large, yellow curved line there represents the retina. And then we have blow-ups of the retina in two places on the extreme lower right of the screen.

The center portion of the retina, which is blown up all the way on the right, has many rods in it, and the rods are the receptors that pick up color. And they're also the ones that are the center portion of your field of vision that pick out the detail.

And going off to the sides of the retina, this is the area that picks up your peripheral vision. The receptors there are the cones, and their function is to pick up motion and contrast. And in nighttime conditions a lot of your vision is using the cones.

A PARTICIPANT: Martin, I think it's the other way around. Cones are color.

MR. GUTTENPLAN: You're right. Cones are color. You're right. Okay. Next slide please.

We encounter visibility hazards not only at night but also in low light situations and where the sun is also low on the horizon, and we need to keep this in mind as well. The glare caused in this scene makes it very difficult to see the bicyclist who is on the left of the screen. Okay. Next please.

This slide is actually of a fluorescent orange fire truck. However, the fluorescent is not picked up by the film or the video. In daytime or low light

conditions, fluorescent colors are very effective, and the research shows that a fluorescent yellow which is a lime green is the most effective of those colors and is something that we should take into account as this fire agency has done. Next slide, please.

And if we're not in the fluorescent range of colors, just a regular yellow is the most visible of all the colors according to most of the research out here, and this is due to the fact that yellow falls in the center of the visual spectrum. And we'll get in just to how other colors are filtered out with aging processes, but let's keep that yellow in mind. Next please.

I'm going to show two slides in a row which show the effects of aging. We did this by -- we took basically the same scene and shot it at two different F-stops. The second scene will show what will happen when we reduce the light on F-stop, which is the equivalent of 13 years of aging.

So this is the first scene, the scene in the eyes of a 26 year old. The next slide. And in the eyes of a 39 year old, this is what's seen. And this is something that we need to keep in mind because as we age, every 13 years, we lose our vision to this extent, and more light is necessary to see. Next.

I'm going to go over briefly some of the characteristics of aging and how that affects vision. And what we're talking about here is applying this too so that we have this knowledge when we're looking at what a motorist is up against in seeing a bicycle at night. When someone's over 55, they require three and a half times the contrast to make out differences. Next slide.

As you age, the ability to shift your focus from close focus to distant focus is very difficult and takes more time. So in other words, if someone is older, and they're driving along, and they're looking at their speedometer, then they look up, and they have to detect a bicycle out on the horizon, they won't be able to do that as readily. Next please.

Another thing that happens to older people is they're more susceptible to glare. As you get older -- well, just during life -- your lens is bombarded with particles, wind particles and things like that, and it puts little pits and scratches on your lens of your eye. And then as you get older and older, those pits then tend to refract the light

more and send it out into star-shaped patterns, making it more difficult to see. Can we have the next slide please?

So you get the glare effect. When you're younger, that wouldn't be an issue. Next slide, please.

As you age, also your peripheral vision decreases as well. And we need that peripheral vision when driving, particularly when you're talking about detecting something small and not really what you expect to see, such as a bicyclist. Next slide, please.

One other thing that happens is that the lens yellows. The cells in the lens die. There's dead cells that accumulate there, and it takes on a yellow color. And that actually becomes a filter.

And, as you see on the right hand side of the slide, the light that goes through that yellow filter -- the distribution of the colors changes so that the yellow light is still fairly predominant, but you're losing a lot of the blues, the greens. And that makes a difference as well and something we need to keep in account here. Next slide, please.

I'm going to talk briefly about some research that we did at the Institute of Police Technology and Management at the University of North Florida. We were doing research on conspicuity. And we'll show this on the screen so you have an idea. Let's move on. Next slide, please.

Okay. There are three figures in this picture. Which one do you think is brightest? Is it a toss-up? Does anyone have a -- okay. No one's answering. When we show it as a slide, the fellow on the left with the -- he has a retro-reflective shirt on and a retro-reflective arm band, and that comes out significantly brighter. You know, we often tell pedestrians, "Wear white at night," and not to wear dark colors.

The person on the right, all you can see are his white sneakers at this range. And the woman in white is still fairly visible. Let's go on to the next slide.

This is from further away. I think we're getting close to it. And here, if we had the actual slide, and we had a darkened room, you would still see the fellow's sneakers, but in this instance you can't. You can barely see the woman in white, but the person with the retro-reflective shirt and bands on are still visible.

And I did bring some samples of these along if anyone wants to look at them at a break or something we can go into a dark area and shine a flashlight on it. Okay. Next slide.

One other aspect that needs to be considered here is the range of our low beam lights. A lot of the research suggests that our low beam lights only illuminate us effectively up to 20 miles and hour. And after that point, we're over driving our headlights. And the other research says that 90 percent of our driving is done on low beams. So just wearing white for a bicyclist is not going to do the trick, is it? Okay. Next.

Motor vehicles' windshields go through quite a bit of wear. I have a companion slide, but not with me that shows just even after a year the types of tracking and distortions that occur just from the usual driving task. And this is more to show the effects of driving in fog, snow or something like that, rain, and how that seriously affects our visibility to a driver. Next, please.

Okay. We've just finished a lot of the actual visual portions of conspicuity and sight. Now we're going to go on to some of the psychological parts because the brain just translates that visual information into electrical impulses, and then it processes it to come up with the actual image that we see.

This slide, the text has no real meaning for us. It's a little exercise, and many of you have probably done this. If you've done it, just bear with me. If you haven't, it will be fun.

We're going to have the Fs represent the bicycles on the roadway. In other words, we're the motorists looking for the bicycles on the roadway. I would like for you to count how many Fs that you see, and I'll give you the first one.

The first one is the F in the beginning of the word "finished." Take a second and see how many Fs that you can see. Okay. If you've seen all three Fs, raise your hand. Okay. If you've seen all four Fs, raise your hand. If you've seen all five Fs, raise your hand. If you've seen all six Fs, raise your hand. Okay.

Those of you who saw the three Fs are speed readers. Like many of us as drivers, you know, we just get the task done as quickly and as efficiently as we can. Rather than point out because there are so many monitors -- so the first F is on

finished, the second on files, the third is on --

A PARTICIPANT: Of.

MR. GUTTENPLAN: Right. The F on of, the second F on of, the third F on F in scientific and the last F on of, before many years. Okay.

And this is just to point out we see what we expect to see. And this is what happens to the motorist, too, and it's something we need to consider. We, as a group, have an obligation to make bicycles something that a motorist expects to see. Okay. Let's move on to the next slide.

Okay. Who wants to be bold and volunteer what they see here? What's the most obvious thing they see here? Someone shout it out.

A PARTICIPANT: The yellow-green.

MR. GUTTENPLAN: Okay. The yellow-green swimsuit. Any others?

(No response.)

MR. GUTTENPLAN: Okay. No one else is bold. Who sees the photographer in the picture? Raise your hand. Now that you're looking, who sees the photographer? Okay. There is a photographer, and it's a reflection in there. And that's about as visible as many bicyclists are even in daytime, let alone light without lights.

The photographer is sort of in the lower right hand portion of the screen between the blue -- the pink and the green suit. Okay. Next slide.

What do you see here?

(Laughter)

Okay. The ones laughing, what do you see? What draws your eye to it?

(Laughter)

Okay. They won't say. It's the guy with the blue shorts on, right? You look at the guy with the blue shorts, right? Okay.

So the eye is attracted to the woman in the white on her rear end for whatever reason that might be, but that's where the eye is attracted. Again, to make bicycling safe, that's what we need to do here is to attract the eye to the cyclist. Next, please.

Who can see what's in this picture?

A PARTICIPANT: The cow.

MR. GUTTENPLAN: Right. There's a cow in the picture. Did people catch the cow?

(No response.)

MR. GUTTENPLAN: The snout is sort of to the left in the center. You see the beginning of the snout and the eyes. Again, if I had one screen, it would be a lot easier. But trust me, there's a cow there. Okay. Next.

How about this one?

A PARTICIPANT: A dalmatian.

MR. GUTTENPLAN: Do you see the dalmatian in there, or do you see the dalmatian now that you know there's a dalmatian in there? And he's laying down over to the right. Okay. Next.

So we talked about these psychological effects, getting the eye -- getting ourselves to make those connections, to expect the cyclist there.

The next thing we want to do is change the conditions so that recognition of the bicyclists can occur. And there are four stages of this.

The first stage, the driver is driving along, and it's a situation like this. And they see that something's out there. Okay. That's the first stage.

And the next stage is that they'll select in on one of the items that they see. In this case, I assume most of you are selecting in on the red lights that are the taillights of a vehicle. Let's go to the next slide.

The third slide shows the third step is the beginning of a recognition of what that object might be. In this case, it's the pedal reflectors of a bicycle, and there's actually another light source there or reflector as well. But that up and down motion, the circular motion of the pedal reflector gives something to the motorist that they can start to recognize, that there's a bicycle out there.

What I didn't say in that previous slide is that there was also a bicycle. And you wouldn't have seen it. In this particular scenario, you can barely see it in a completely dark room. But we select on the thing that's the brightest, that attracts our attention the most. Okay. Next slide, please.

And then after you recognize the object, you need to determine where the source of it is, how far away from you is it? Where is it on the roadway?

And the research shows that to do that, you need to have more than one source of light coming from it. In other words, the reflectors need to be perhaps 20 inches apart, or there needs to be something that -- like the shirt -- that gives it a human form so that you know there's a human form.

So when you have more than one source of visual information, and you know what the thing is, then you as a driver can make the determination how far it is from you and where it sits on the road.

And so here we have the cyclist with the retro-reflective helmet, the retro-reflective shirt, the Kearney lighting system, the trouser bands. All those things make it possible to determine where that cyclist is on the road.

And I think that's the end. Last slide? I think that's the last slide. Yeah. Oh, no. Again, more retro-reflective goodies. You can't tell there's a man and a woman in that slide. You can normally. But you can see his pedal reflectors, his shirt, headband. All those things make a difference.

So I hope this was helpful and sets the groundwork for our discussion later. Thank you.

MR. MEDFORD: Well, thank you very much. I now know why I can't see at night. I'm over 39, and I only saw three of those Fs. So, in fact, that was real helpful, Martin. Thanks.

I'd like to next call on Mr. Kirby Beck. Officer Beck has been a member of the police department in the Coon Rapids, Minnesota, police department for over 15 years. He's a community police officer and spends most of his patrol time on a bike. He's a League of American Bicyclists certified instructor and a member of the International Police Mountain Bicycle Association. So welcome.

PRESENTATION OF KIRBY BECK
COON RAPIDS POLICE DEPARTMENT

MR. BECK: Thank you very much. I'd like to apologize. I see all these wonderful graphics and color images, and it's nice to know that the government has a lot of money to spend on that. Unfortunately, the Beck family budget works in black and white. So the visuals you're going to be seeing are black and white. Sorry about that.

Let's start with our first slide here. We're going to be talking about effective cycling. Now most people in this room know what I mean when I refer to effective cycling. But I'm going to assume that not everybody does.

So effective cycling means a couple of things. Most commonly, it's going to mean riding in a vehicular style. In other words, you're riding as a part of traffic. You're riding as another vehicle operator upon the roadways. That's what we most often mean by effective cycling.

It also talks about a cyclist training program that's run by the League of American Bicyclists. So those are the two major meanings we're talking about when we discuss effective cycling at night.

What I'm going to talk about this morning, however, talks about riding at night, of course, in an effective cycling style.

And when we talk about that, we're going to be looking at three basic things. We're going to be looking at considerations and possible modifications in, number one, the equipment we use when we ride at night, secondly, techniques or tactics that we're going to use to help us survive while riding at night, and thirdly, we're going to look at route selection, which might be modified. Let's go to the next slide, please.

Okay. We're going to look at equipment in this one. We can go to the next slide. Hello. This is a nice slide, but the next one's even nicer. Thank you.

Okay. I didn't want to exclude a helmet. I really think helmets should be worn every time you ride a bicycle. I do slow speed drills in my basement in the middle of the winter to kind of keep my balance okay, and I even ride in my basement with a helmet. And people say, "Well, why do you ride in your basement?" I'm weird, you know. Sue me.

Okay. I didn't want to neglect a helmet. If I didn't say it, somebody would remind me. So we're just going to say helmet and move on.

The next pieces of equipment would be those that are certainly required by your state traffic code. And often those are going to be headlights. I don't think there's a state in the country that does not require headlights for riding a bicycle on public roadway at night. Okay.

In addition to meeting the requirements of that law, and oftentimes, it's rules

like, "It has to be visible 500 feet away," there's another thing that a cyclist should consider. And that is that headlight better be bright enough to illuminate the way ahead.

Normally, a headlight serves two purposes. First of all, it's to help you be seen in traffic when you're approaching an intersection.

But secondly, it's to help you see. A headlight that simply is bright enough to let you see what you're about to hit as you hit it really isn't a good enough headlight. You need something that's going to illuminate the way out ahead of you so you can see hazards in the roadway, on the surfaces usually, and have time to react to them appropriately.

Okay. The second requirements usually talk about things like reflectors or taillights. All states require reflectors, usually a red reflector in the back. Most require pedal reflectors. Most require some sort of side reflection, either mounted on the bicycle or worn by the rider, but something that's on the side, visible from the side.

I believe five states require taillights, active taillights, in other words, a battery operated or electrically operated taillight.

The last piece of equipment that's required day or night are brakes, and sometimes we fail to realize that. And especially with children, as I'm out and about, I see an awful lot of bicycles, especially the type --

(End tape 1, side 1.)

MR. BECK: -- or the little BMX-type bikes that really take a beating and often will have a hand brake that doesn't work. And a brake that doesn't work isn't any good at all.

Okay. So that's the equipment that's required in terms of fulfilling the state law. And certainly, if you're not fulfilling the state law, and you're involved in a crash, your position from the legal standpoint is not very good. But those certainly do enhance your safety.

The last thing you might want to consider are some accessories or clothing which also serve to enhance your conspicuity and recognition.

We just saw Martin's presentation on trying to enhance your conspicuity in

traffic. One thing I want to add is you have to think about how low beam headlights are aimed. Okay. He said 90 percent of the driving is done with low beam headlights.

Typically, low beam headlights are aimed about two or three degrees below horizontal and two or three degrees towards the right shoulder. Okay. Those reflective items on a bicycle which are mounted low are going to be spotted first. Pedal reflectors are typically lower than the red reflector. Those are going to be spotted first, and also the movement is going to be very visible.

A lot of cyclists like to wear helmet reflectors, thinking they work very well. The problem I have with helmet reflectors and what I've seen is oftentimes the cyclist is bent over, especially if they're on a road bike with dropped handlebars. They're wearing a backpack or something. That helmet reflector is blocked, and, in fact, that helmet reflector may not be seen at all.

But when you think about the way headlights are aimed, it's also -- since it's the uppermost reflector -- it's also going to be the last reflector seen. So if we mount additional reflective devices on bicycles or on our clothing, those items that are low are going to be most effective. Let's go to the next slide, please.

I just want to repeat real quickly as I move on here some of what Martin said. I wasn't sure that he was going to be including this, so I want to include this in my presentation.

As he said, seeing is actually a psychological process. The eyes let in light, but it's the brain that sees. It serves basically five functions.

As a driver, you're scanning through the soup and the mess of things that are out there for you to look for. Your eye has to detect something. Next, it has to select it. It has to focus in on that to try and figure out if that's something you need to know. Next it's going to try and recognize that as something it needs to know about.

The next step is it's going to locate that. You have to figure out is this approaching you? Is this going away from you? Is it moving laterally? What speed is it? Is it in the middle of the road? Is it off on the shoulder? Where exactly and specifically is it? And last of all, the driver, having done all these steps, has to react to it appropriately.

So as bicyclists at night we have to use equipment and use accessories which are going to enhance each one of those steps. You want to be detected sooner. You want to be selected sooner. You want to be reacted sooner so that a driver under various conditions is going to be able to react most appropriately. Okay. Next move on to the next slide here, and that's enhancing our nighttime conspicuity.

See, some of the issues we're going to be looking at nighttime is we looked at the involvement of alcohol in nighttime bike crashes. That's the environment that bicyclists are riding in. There are more drivers out there that are intoxicated. There are also more bicyclists out there that have been drinking and are affected by alcohol also.

But because of that situation and over driving headlights and all of the things that we talked about earlier, we want to make sure that the equipment is working for us.

To enhance our conspicuity at night, we're going to look at some things. First of all, the size of the objects we're looking at. So we're looking at larger reflectors. We're looking at more lights, one headlight versus two headlights, for example. So size is something that's going to help the brain select something sooner.

Intensity. Certainly brighter headlights or brighter taillights or brighter reflectors are going to attract attention sooner than something that's very dim. Again, a larger reflector is going to be much more intense than a smaller reflector.

We talk about amber versus red. As Martin said, amber lights are more in the middle of the color spectrum. They will be seen sooner by more people. As you age and you start losing your color discrepancy a bit, that amber is going to be seen more often.

Now I also want to remind you that red is typically a color we associate with the back end of the vehicle, and if you're riding on the road in a vehicular style of cycling, you might want to be recognized as a vehicle. So that's something for us to discuss later perhaps. But I do want to contend that an amber light mounted low will be seen sooner than a red one.

Next is movement. And I think movement is incredibly important for being spotted and enhancing your conspicuity at night. Anybody that's ever driven a car and

come across the bicyclist will notice the red reflector, but they usually notice the red reflector after they've seen the little yellow pedal reflectors moving. Why?

That movement focuses your eye quickly. We're used to seeing little red reflectors out there. A lot of people have them on their mail boxes or on little stakes on the end of their driveway. Excuse me. So red reflectors -- after a while our mind shuts off. When you see those moving pedals, boom. You focus your attention in very quickly.

Ankle bands are certainly a substitute. Some of the pedals manufactured now, some of the clipless pedals, have no place to mount reflectors. Therefore, you need some sort of supplemental reflector, be it on the shoes, be it ankle bands, whatever. But those are very effective warning devices.

We also have accessories such as flashing lights. There's a yellow beacon that's been on the market for years. It's known as a belt beacon. It's wonderful. It's yellow. It's spotted. Is it recognized immediately as a bicyclist? I don't think so. In fact, there was a study done some years ago that showed that, although it's spotted, and it's detected a long ways away, it's not necessarily recognized as a cyclist right away.

And there's a lot of flashing lights and LED flashers on the market now which are excellent. However, they do not necessarily aid in recognition, simply the detection. We still need supplemental things on pedals and creating that movement that help with that. There's also strobe lights out there.

The last thing, and it's not on the slide. I neglected to put it on the slide -- is there's a product called a Leg Light. It's like a little flashlight with a beam that goes out horizontally that's clipped normally to the outside or the left leg but again, adds movement with an active light. That has been shown to be very effective in adding to your conspicuity at night.

The last thing I want to talk to about conspicuity as Martin added, is you need to create a shape that's readily and quickly recognizable as a bicyclist. He showed the slide of the firefighter standing next to the fire truck. If you noticed that firefighter, in addition to his yellow turnout gear, they have yellow reflective strips on arms, legs and across the chest.

Take a look at news footage the next time you see a fire, and you have those bright media lights out there. You see these little creatures, arms and legs and a chest moving about. You spot it instantly. You know instantly that that's a firefighter. It's there for a reason.

If we can create that same effect on a cyclist with arms that are reflectorized so we can see arm signals, for example, or on legs that create movement and also create shape, we can greatly enhance conspicuity greatly enhance our safety as cyclists out there at night.

Okay. Techniques and tactics. Let's go on to the next slide, please. Thank you.

Okay. Some things to think about. These are going to be some modifications from our daytime cycling. I wanted to add by the way that there was a survey done on one of the computer networks of cyclists. They got, I believe, 120-some responses from around the country, and perhaps Gil Clark will address that in a little more detail later.

But a lot of what I'm going to say is also reflected in that survey, that experienced cyclists from around the country use these kind of techniques. And these are people that commute at night on a daily basis. So they're very skilled cyclists.

Okay. The first thing they found is they find it's a lot safer to ride less in the dropped handlebar position and sitting upright more. They can see better. When you're riding in darkness, your vision is greatly decreased. You can't see dogs that are running up on you. You can't see cyclists that might be coming up on you, especially without headlights.

One of the most hazardous things for me is a cyclist that's riding without headlights, without any reflection or reflectors or anything and is riding against traffic, in other words, riding on the wrong side of the street towards me. I come around a parked car, and there they are, boom.

If I'm down on the drops, you're not going to see that. So I need to ride a little more upright so I can be a little more aware of the environment that's around me. Okay.

Second, you need to decrease your speed, especially when you're descending

big hills. It's very easy to override or overdrive most headlights systems. Okay. And on big hills, it's not at all difficult for cyclists to hit 25 or 30 miles an hour if they're not careful. So you really need to control your speed better when you're riding at night.

Now in effective cycling, if you take the actual course, we teach a number of evasive maneuvers, ways to deal with different emergency situations. And those are all well and good, but I really believe at night, because your vision is decreased, it's not as effective, you can't spot those emergency situations quite as fast.

It's a real good idea to have a hand near that brake lever, at least on hand, probably near the rear brake lever, so you don't end up on your face if you're not real practiced at stopping with hand brakes and how to position your body and what not. Using the back brake only, it will at least slow you down. But you have to have a hand near the brake lever to do that.

The next thing on the list is pedal when an overtaking vehicle approaches you. Even if your coasting, if you sense a vehicle is coming up behind you, it's really beneficial to pedal at least slowly. And the reason I say that is pedal reflectors, as we said, are a very, very effective warning device.

However, if you are coasting, it's possible that your heel is covering that reflector or that the angle is off just a slight amount and that reflector isn't working. By pedaling, you can change that angle. You can perhaps disclose that pedal from your heel, and you can really do a good job of alerting that motorist that you're there.

We teach the police officers in our police cyclist course when they're out riding at night to at least pedal a little bit.

We have a second reason, too, by the way. If you're trying to sneak up on somebody, and you're coasting, you can hear that little ratchet in the free (phonetic) go, like click, click, click. If you pedal even just a little bit slowly, you know become stealth mode man. They cannot hear a thing. So it's kind of side benefit for the good guys.

Okay. Next, vehicular cycling works very well in the daytime, very well. I feel much safer riding in that style than I would be riding as far over to that right and as inferiorly as I can think of.

But as much as I think of effective cycling or vehicular cycling in the daytime, I have to point out that with all the drunks on the road and the different factors, the fact that you can't see road hazards as readily, I think you have to show some flexibility at night. You definitely have to show some flexibility at night with lane use.

Vehicular style cycling, for example, encourages you to use the turn lanes as they're intended to be used. If you're going to make a left turn, you make a left turn from the left turn lane.

In the daytime, especially if you're using high conspicuity clothes and what not, that's terrific. At night, however, I think you need to show some flexibility. As you get over to that left turn lane, it's possible, if there's a lot of oncoming traffic, you may become lost in those lights. If it's raining, for example, and you have the smeary headlights and all the things, you may not be seen.

It may be safer from the effective cyclist standpoint to perhaps do what we refer to as a pedestrian-style left turn. In other words, you go through the intersection, turn the bike and go through like you would as a pedestrian, basically following the lines of the crosswalks, not necessarily riding in the crosswalks, but making that style of the turn. That was one thing that survey that I referred to said also, you know.

As well as effective cycling skills, vehicular cycling skills work in the daytime. At nighttime you might be safer in some situations to ride in that pedestrian style. Okay.

Next, it certainly is incumbent on the cyclist to obey all traffic laws. If you are going to go through stop signs and stop lights and ride against traffic, it's dangerous in the daytime. It's much more dangerous at nighttime, and you must obey all traffic laws.

And last of all, talking about techniques and tactics, is avoid alcoholic beverages. If you plan on going out and riding your bike, stay away from alcohol, period amen. Okay.

Now the last thing -- if you could give me the next slide, please. The next thing is some considerations on routes. A big part of bicycling safety is picking a route that's good.

In the daytime, sometimes cyclists like to stay away from arterial routes. The traffic levels are too high, and they just are not comfortable there. I believe an effective cyclist is comfortable just about anywhere they can ride legally. But when you're riding at night, you're going to find that arterial routes are probably going to be a better choice for a couple of reasons.

First of all, most of your arterials have better lighting. They have better lighting. If you find yourself on a lesser travelled road with less effective lights, you're going to have big dark spots between the lights. When you get out on a major arterial, it's pretty well lit. It's almost like a poorly lit football field. You can see very well. People can see you better. Those arterials are much better there.

Also, if you think about it, the arterials are going to have better shoulders. They're going to have better maintenance, which is better because road hazards, surface hazards, bumps, changes in the grade between the -- what happened? It's moving.

Changes between, like the gutter pan and the pavement often will be different. It's harder to spot that at night than in the daytime perhaps, certainly if it's filled with leaves and debris. Leaves in the fall now is a real hazard. You can't see that. And if you're riding over there on a lesser road that doesn't have as much shoulder for you to ride on, it's going to be a hazard.

Okay. I'm moving on here. We have decreased traffic levels. Arterials in the daytime and at rush hour are busy. At nighttime, they're not too bad often. And it's just a lot better environment out there.

And lastly, when talking about arterials, you're going to have more people around. And in some neighborhoods and some environments it's a good way to discourage crime. You start talking to some cyclist in particularly urban communities, nighttime walking or cycling, one of the biggest factors that discourages them is their fear of crime. And if you're out in a well-lit area, you're out where there's a lot of people, potential witnesses, you're going to feel safer. Okay.

Now some people still like to ride on residential streets as a route choice, and they feel that they would rather have a quiet street with no traffic around. Even though it's not well-lit, they have a good headlight. They can still see the roadway

ahead of them, and also that good headlight silhouettes them, which aids in their being detected. Okay.

Residential streets, though, may hide some of these things like puppy dogs that are unleashed and like to eat cyclists legs. They might also in the shadows harbor some of the criminal element and what not.

Lastly, in talking about a popular option of bike paths, bike paths at night are extremely dangerous. That's my opinion and the opinion of most of the people in that survey.

The reason for that, first of all, they're not well-lit. They really are not designed in most cases for nighttime use. There is no lighting out there at all.

Secondly, if you're a police officer, you realize that that's where a lot of your problem people go at night. Where do criminals go to do their partying and their drinking and their drugs? They go where the cops are not, and the cops are not on those bike paths.

And now if you're out on a bike path in the middle of the night -- at night, not in the middle of the night, but in the darkness -- and you happen to cross one of these situations, it's not a very safe environment perhaps. Many cyclists don't like them. Okay.

Next, in terms of routes, nighttime is the time to use a route you know. You're going to be more familiar with the hazards that exist there. Nighttime is not the time to go out exploring new routes more than likely. Okay.

But most of all, I want to stress the fact that, as with your riding technique, your route selection at night should be more flexible. Okay.

I've spoken with some officers that ride around the various parts of the country, and they say, "Lookit, I just plain will not go out and ride in traffic. I don't care what I've learned in terms of effective cycling skills. It's not safe for me to be riding out there, even with my equipment."

They know their environment. They find optional routes, whether it's up on the sidewalk, God forbid, or wherever it is. But they feel uncomfortable riding in it. You have to, as a cyclist, trust your instinct and not be necessarily honed into any particular style of riding. At nighttime you've got to be flexible. It can be done

safely, but you have to use your head. You have to use equipment, et cetera. That's what I had about effective cycling. Thanks.

MR. MEDFORD: Thank you, Officer Beck. That was very interesting. What I would like to do now is to open the floor up to questions for any of the three speakers so far.

And I wanted to ask -- before we get started I wanted to ask Greg Rodgers a question about the alcohol and whether or not we know -- the alcohol content you were talking about dealt with the bicycle riders per se and not with the people with the automobiles, is that right?

MR. RODGERS: That's right.

MR. MEDFORD: Do we know anything about the automobile drivers in terms of alcohol content?

MR. RODGERS: The only information that I'm familiar with is a publication that NHTSA puts out. And -- for example, they said that about a third of all bicycle accidents involve alcohol either on the part of the driver or the part of the bicyclist in 1991.

And they also said about a quarter of the accidents involved bicyclists who had been drinking. So it's not exactly clear what proportion of motor vehicle drivers had been drinking, but it was a sizeable portion it looked like.

MR. MEDFORD: Good. Okay. I would like to open up the floor to questions. Yes, sir? Could you pull the microphone?

MR. FORESTER: This is John Forester. Got some comments about what has been said. There's been lots of talk about reflectors and reflectorization of various kinds. The best information you can get from Ken Cross's statistics is that 75 percent of the car-bike collisions that are probably caused by darkness come from the front where reflectorization is essentially useless.

Reflectorization works only when the motorist's headlamp beams are on the bicycle or the rider at the time that he can take action to avoid a collision. By and large, that's only when the cyclist is being overtaken from the rear.

I would also say that in great attention paid to recognition, look at the text. If I were told not to drive into any of the letters, I wouldn't hit any of the Fs nor any of

the Xs either. It doesn't matter what it is as long as you know it's a traffic object. You're not going to hit it. You're going to steer away from it. You don't have to know it's a cyclist. You have to know it's something that's illuminated.

I would also say that I have not seen any data showing that there is markedly greater recognition -- estimation, excuse me -- estimation of position when you see a person's shape or a bicycle shape as opposed to seeing simply a source of illumination moving against the background.

Now it's quite true that if the only thing that exists is a single light, you can't tell how far away it is. But when you're driving down the road, the background's moving, and the light, being a cyclist, is moving relative to the background. Therefore, I think that it is far less important to try to distinguish if this is a cyclist and to recognize it as a cyclist than it has been said.

MR. MEDFORD: Thank you very much. Comments, other questions? Yes, sir?

MR. HERZ: Roger Herz, Bicycle Transportation Action. I believe we should focus on the fact that the bicyclist is bigger than the bicycle in most cases, and many laws are somewhat off the point by requiring certain devices on the bicycle.

Now for instance, might I wear a Leg Light, a Sanyo which apparently has been discontinued that I'm rather fond of. And I'm not sure that actually meets code, but it certainly provides much better visibility, particularly with the up and down motion, than a similar device mounted on the bicycle.

MR. MEDFORD: Okay. Other questions, comments? Yes, sir, down at the end, my left.

MR. SCOVILLE: I'm Russ Scoville. I'm with the Federal Transit Administration and a cyclist of many years. And I've taken my hits. But I'd like to pick up on the same point of equipping the cyclist and not the bicycle.

If you're going to be parking a bicycle anywhere, the accessories are easy hits. And so if you buy a better light, and it's costly, it's also going to be a target for theft.

If you have a package that you can just pick up from the bicycle and walk away with, you'll have it that evening when you want to go home. That's all I had to say.

MR. MEDFORD: Fine. Okay. Yes, Mr. Bacon?

MR. BACON: Yes. Chet Bacon, 3M Company. This is regarding the Florida study information. The yellow color or lime yellow is recognized as the most visible during the day. I was wondering if there's any information in the study that approached or looked at the nighttime color recognition.

MR. MEDFORD: Mr. Guttenplan.

A PARTICIPANT: He brought that out in one of the slides, Martin Guttenplan's.

MR. MEDFORD: Yes. I -- is Rich Blomberg in the room?

MR. BLOMBERG: Yeah. I'm still here.

MR. MEDFORD: Do you have any information on that?

MR. BLOMBERG: As far as I know -- I haven't looked in the last few years, but I haven't seen a study that anyone did about color recognition at night. There have been a lot of studies done of various color signatures at day and night and what they can do for recognition. A lot of these have been in the marine and the aviation environments using various colors of lights.

It's important to note that most of the work on the lime green color came out of the firefighters' work, some work done by Dr. Steve Solomon in upstate New York, that has since been superseded by other work. And it's not quite clear that lime green, Marty, is in fact the best color anymore. It is a good color, but there's work to suggest that other fluorescent colors and high visibility colors may be as good, depending on the circumstances.

And usually what it comes down to is what is your background color, what are you contrasting with in order to get conspicuity.

MR. MEDFORD: So following on to that, bicycle riders and reflectivity, what does the latest research sort of indicate in terms of the color, based on what you just said?

MR. BLOMBERG: I haven't seen any research that specifically looks at that color.

MR. MEDFORD: Looks at that issue. I see.

MR. BLOMBERG: Partially because, for example, the CPSC requirements

specify color.

MR. MEDFORD: Right.

MR. BLOMBERG: So you don't find a lot of variety of color out there. I know in our study we did not systematically look at color. We were more concerned with other factors. When you start crossing a lot of different factors, you get a lot of cells, and in experimenting -- and you just can't do them all. So --

MR. MEDFORD: Right.

MR. BLOMBERG: -- we picked a different set of conditions.

MR. MEDFORD: Yes, sir.

MR. SWART: I'm Randy Swart from the Bicycle Helmet Safety Institute, and I'm partial to orange. But apart from that, I hope that people will not use Kirby Beck's comments about the higher reflectors being the last thing to be seen to dismiss bicycle helmets. I think it's important that we recognize that helmets are becoming more and more universal and will become more universal in the future.

As a result, the one thing that you can depend on a cyclist having on -- when you think about all these other things that can enhance visibility, the one thing that they are going to have on would be a bicycle helmet. And if we can put something in the CPSC's bicycle helmet standard, which is going to be published soon, that requires reflective surfaces or conspicuity enhancements, we can be sure that cyclists will have that on at the time that they ride.

MR. MEDFORD: Yeah. That was an issue that came up in a meeting that we had on bicycle helmets just a couple of months ago, and it hadn't been contemplated until that meeting that we would consider putting reflectivity requirement into the standard for bicycle helmets.

And then I listened to what Mr. Beck had to say this morning, and what I wondered about in terms of low beam headlights, in terms of you sort of see, I guess, a brightness sort of as vertical from the bottom up. But certainly, shape, size, in terms of reflectivity, must have some bearing on that so that -- would you suggest, Mr. Beck, that you don't see a need for a requirement on helmets like that, a reflectivity requirement?

MR. BECK: My biggest problem with reflectors on helmets isn't as a cyclist

so much as it is as a police officer. I've had some real debates with people regarding the flashing LED flashers. Some officers elect to put them on their gun belt so that the light goes with them wherever they go.

Some officers in some parts of the country are very uncomfortable from the safety standpoint of having that with them, forgetting to turn it off, and now they have this little beam identifying them wherever they go.

That's going to be my concern as a police cyclist. If I'm required to have a reflector on my helmet, and now I get off my bike, and I leave that realm of being a cyclist, and now suddenly I'm a police officer, and I have this reflector on my helmet, especially if I forget I've got it on, and I'm walking across an area. I'm trying to stay somewhat covert.

MR. MEDFORD: That's a sort of special circumstance for you, though, in your profession. Yes.

MR. BECK: No. It is. But that's my concern. I mean, first of all, an officer is going to be expected to obey the laws certainly.

MR. MEDFORD: Yes.

MR. BECK: And if the law says he's got to have this reflector on his helmet, well then he's going to have to have it on his helmet. A lot of them are either going to frankly either, one, choose to disregard the law or whatever.

MR. MEDFORD: Yes.

MR. BECK: I'm not -- I don't want Randy to get the wrong idea. I'm not discounting. I think people want to put them on their helmets. They're not always going to be ineffective. Don't -- I may have been misunderstood there.

MR. MEDFORD: That's fine.

MR. BECK: My point is if that's the only additional reflector you have, there's better places to put it. That was my point.

MR. MEDFORD: Okay.

MR. BECK: You can illuminate everything, and you're going to be safer. That's my --

MR. MEDFORD: Okay. Down in this corner here. First Mister -- James, I can't see your last name.

MR. MACKAY: I'm James MacKay. I'm a bicycle and pedestrian planner for the city of Denver. We'll be talking about a number of issues today. I believe they might be roughly lumped into two categories, individual choice and societal norms and also technology.

I would like to speak to the technical issues for a moment. If we looked at some of the improvements in motorcycle nighttime safety, many motorcycles now have two headlights. That allows motorists in an oncoming situation to actually track that motorcycle and have an indication of their direction and particularly of their closing speed as compared to just the single headlight that -- you know it's out there but can't quite tell where or how fast it's approaching.

Personally, on my commuter bike I have two headlights, and they're offset about a foot from each other. I find that redundancy very handy as well as the fact it allows oncoming motorists to track me as a cyclist.

Speaking to the issues of rear conspicuity again, I have two rear lights, one mounted on my rack and one mounted on my seat. Again, with the offset of approximately a foot, this allows people closing in on me to track closing speed.

Something else I have on my commuter bike is a semaphore or paddle that mounts low by the rear frame drop-out. This is a arm that actually swings out approximately 14-16 inches away from the bike frame, and it has a reflector, red to the rear, white to the front.

It's an off-the-shelf product I bought. I believe it's made over in Scandinavia. And this reflector actually spins in the wind, creating a flickering effect in motorists' headlights, both oncoming as well as approaching from behind.

The thing I like about the semaphore reflector the best is the fact that it gives me an extra foot of clearance at night. Motorists see that and will give me an extra foot of clearance because they're clearing the reflector, not the actual bike frame. And I would like people to consider these topics in further discussions of nighttime bicycle conspicuity. Thank you.

MR. MEDFORD: Good. And we're going to have a whole discussion just a little bit later on reflectivity, so we'll get into some of that. But I think -- did you have a question?

MR. SCHUBERT: I'm John Schubert. I'm an industry consultant, and I'm also an advisor to the Pennsylvania Department of Transportation. And I would like to first of all say, by and large, I agree with Mr. Forester's remarks that we are overlooking the limitations of reflectors at least so far in this discussion.

That said, I want to make a comment about reflectors as an addendum to Martin Guttenplan's presentation, and I also want to thank Fred DeLong who about 15 years ago wrote a technical article which is the basis of what I'm about to say.

What Mr. Guttenplan didn't mention is that there are a lot of places where undulations in the roadway can hide a low-mounted reflector, including a pedal reflector. In the particular part of Pennsylvania where I live that is a rather major problem. So to the extent that a bike rider relies on reflectorization, he better have it from nose to toes for that reason.

MR. MEDFORD: Mm-hmm. Good point. I think Mr. DeLong -- did you want to make a comment?

MR. DELONG: Get Gil Clark.

MR. MEDFORD: Yes, sir.

MR. CLARK: I just want to interject at this particular point in time a note that we need to be cognizant of the group of people whom we're trying to address this plan at. We're focusing in on people, for example, who wear helmets, but when you look at the demographics here, half the people who are injured or killed at night alcohol is involved.

Who are these people? These are not people who are effective cycling adherents. They're not cycling enthusiasts. Generally, they are people going to and from jobs as dishwashers, and they've stopped at the bar at night. We are also aware that -- and if you talk to any bike shop owner, they'll tell you that they sell lots of bikes to people who have had their driver's licenses taken away because they've driven under the influence.

These people want the cheap bike. They want to get to and from wherever they need to go. It's essential. They are driving their bicycle for transportational purposes, and frequently, they're using bicycles that are old, that don't have any reflectors.

They're not going to wear helmets and we need to -- you know, we need to be aware here that we can have all of the discussion about helmets and so forth, but if the folks who are really being killed aren't likely to wear those helmets, then we haven't solved the problem.

MR. MEDFORD: I think that's an excellent point. I think probably most of the people that we're talking about are not people that are sophisticated bike riders as many of the people that are here today.

MR. CLARK: Exactly.

MR. MEDFORD: Yes, Mr. Forester?

MR. FORESTER: I think the word fluorescent has been thrown around inaccurately. Fluorescence is a technical characteristic by which a particular dye receives ultraviolet light, high-energy light and transmutes it to low-energy light in the visible range. Ultraviolet high-energy light is available from the sun. It ain't available from any of the artificial lighting sources. Fluorescence does no good at night.

I will also say regarding tracking distance, sure. If you know how far apart the lights are, you can make a better estimate of how far the thing is. But how are you going to know how far the lights are apart.

MR. MEDFORD: Okay. Good point. Excellent discussion. Are there any --

A PARTICIPANT: I would like to make one --

MR. MEDFORD: Yes. Sure.

A PARTICIPANT: -- one other comment. I can't agree with Mr. Forester more about fluorescence and nighttime use. However, there is that we mustn't neglect that time of twilight perhaps, when there is some light where fluorescent materials are very effective. And even if you don't go ahead and put a standard on helmets for retro-reflectivity, I would urge you to create some sort of high visibility standard, maybe perhaps a fluorescent color for the helmet.

MR. MEDFORD: Okay. Thank you.

A PARTICIPANT: Mm-hmm.

MR. MEDFORD: Yes, sir?

MR. BLOMBERG: Just to support that completely, in our research, following on the research that Ken Cross did, one of the main daytime crash types involves a

bicyclist riding along the side of the roadway and a motorist turning left into the path of that bicyclist because the bicyclist isn't seen.

The helmet is in a perfect position to add conspicuity in that situation. The helmet is -- even when the bicyclist is dropped down on the bars. So that's an ideal position for fluorescent material to cover daytime and dusk and dawn when there is a strong UV component.

Just one other point to Officer Beck, and I have had this conversation with officers. I think if you think about how retro-reflective material works, your concern about putting it on your helmet will go away because in order for someone to use that retro-reflective material to localize you, they have to have a strong light source emanating from somewhere between their eyes.

So they are locating themselves completely by spotlighting you. It's not at all like having an active source, and in fact, I think you might enjoy knowing where somebody was going to snipe at you. So --

(Laughter)

MR. BECK: I'm kind of pro-reflective, Mr. Blomberg, but I'm just telling what the other people out there have said.

MR. BLOMBERG: Oh, no. I've heard the comment often, and it's an excuse that officers use, for example, not to wear high visibility vests in making traffic stops.

MR. MEDFORD: Mr. Buckley.

MR. BUCKLEY: I'm Larry Buckley from 3M Company. The whole issue about visibility and reflectivity is a lot of misunderstanding of what makes people visible.

And in our work with police officers, from trying to help them in traffic situations, a lot of them do believe that they're a target. And it's an understanding that if our police don't understand how reflectivity works, the consumer, the cyclist, the pedestrian doesn't understand how reflectivity or high visibility works.

So I would just like to make a comment that anything that's talked -- education is going to be an important issue.

MR. MEDFORD: Yes.

MR. BUCKLEY: Awareness and understanding is an important issue. And it's

probably going to have to start sooner than it is later to get people to adopt it in the future. Thank you.

MR. MEDFORD: Okay. We're just going to take one more question. Then we're going to take a break. Yes, sir?

MR. PREHN: Thomas Prehn. I'm an industry consultant. I just was hoping that we would get one clarification on Mr. Forester's comments. Do we know specifically the percentages of accidents at night that are caused from either head-on or rear?

MR. FORESTER: You'll find the analysis in my book, Bicycle Transportation.

MR. PREHN: Uh-huh.

MR. FORESTER: I think it's in less detail in Effective Cycling. But essentially what I did, I took the -- all the types of car-bike collisions I came across as recorded and split up the proportions, daytime and nighttime. And you find that there are only about four types that have a greatly increased proportion at night. And you can assume, so to speak, that a portion of those occurred simply because the cyclist was there. It would have occurred in the daytime. But the excess was caused by darkness.

And when you look at those, about not quite one-quarter of them are the motorist overtaking from the rear, type 13, and the others are of the type where the motorist turns left in front of the cyclist. They motorist comes from the right or from the left, and it's important to note also at a time when the motorist has a duty to yield.

If a cyclist gets himself out in front of the car, he's going to be hit in the daytime or night. And that is the basis of the analysis upon which I gave my figures.

MR. PREHN: So three-quarters then, you're saying are based upon the cyclist not being seen or the motorist not yielding.

MR. FORESTER: They are based on an approach from the first half-circle.

MR PREHN: Right.

MR. FORESTER: It was right, left or in front and at a time when the motorist had the duty to see the cyclist and observe, observe and yield or, you know, make way for the cyclist.

MR. MEDFORD: Okay. Any other comments?

(No response.)

MR. MEDFORD: Okay. Let's take a -- we're running a little bit behind time. I have just about 10:32. Let's come back at 10:45.

(End tape 1, side 2.)

PRESENTATION OF LARRY BUCKLEY

3M COMPANY

MR. BUCKLEY: Next slide, please. In France, an international study group for road accident prevention came back to say that reflectorized tires as well as reflectors are both visible, but reflectorized tires are recognized earlier when entering or leaving the crossing zone, and the reflectorized tires of a two-wheeled vehicle turning to the left is superior to the reflector because of the better wide angularity.

And this is where we talked about the strong range as to when a person is seen throughout the whole range of motion of their cycling. Next slide, please.

Continuing on with some of our research from countries in Norway, and this is dealing with pedestrian statistics and roadway statistics of pedestrian accidents in 1990.

Approximately 25 percent of pedestrians wear retro-reflective materials at night based on a law that requires pedestrians to wear materials from the early winter to the early spring. Ninety-six percent of those accidents, documented nighttime accidents involve people without reflective materials.

The four percent of accidents that did involve people wearing reflective material were not severely injured nor killed. We know that this disparity shows us that reflective material had a very positive impact on changing the shape of accident and injury. Next slide, please.

In looking at research that has been done here in the United States by Dunlap and Associates and one study done in June of 1980, Detection and Recognition of Pedestrians at Night, it was concluded that bright retro-reflective and anthropomorphic treatments would improve pedestrian visibility and identifiability to drivers at night, and by logical extension, should improve their safety as well.

The human form -- it's not only the bicycle we must consider, but also the body itself. How can we identify a person from the side, from the front, from the rear

by identifying the total image.

Also building on from what Dunlap and Associates has done, the Conspicuity for Pedestrians and Bicyclists, in general, it is strongly recommended that the design of any active conspicuity enhancement also include a retro-reflective standby treatment to take over if the power source gives out.

Some of the things we've seen is that there is not one solution. The solution is going to be comprehensive and must include many technologies to achieve the desired effect. That solution must also incorporate education and awareness. So there's many areas that need to be addressed.

And also looking into the United States, the AAA Foundation for Traffic Safety did a pedestrian survey and research. One out of six traffic fatalities is a pedestrian, and nearly 80 percent of those surveyed incorrectly believed wearing white-colored clothing at night makes them visible.

This is probably one of the most dangerous areas of the false sense of security is that we don't understand what dangers we're in, and without that understanding, people are not going to be willing to take action to change it. Next slide, please.

Also done in the United States, the School of Engineering and Applied Sciences at the University of California in looking at motorcycle reflectorization -- "The presence of a standard motorcycle with lights on was correctly ascertained 45.4 percent of the time it was presented, whereas if the motorcycle also has reflective tires, it was correctly judged present in 97 percent of the times it was actually presented.

The standard lighting sources we use for motorcycles can be greatly improved by how to make the design of the motorcycle more effective, and the same theory can also be used for the bicycle as well.

In talking about reflective technology -- next slide, please -- we look at key design factors which make an effective material. The first design factor is luminance, the intensity of the retro-reflective light as perceived by the driver, and this is not just from the head-on or the approaching angle. This is from all angles of movement. So whether it is a pedestrian or bicycle turning left, turning right, moving and changing lanes, they must be visible, clearly visible.

Durability of materials for the application, the retention of 50 to 80 percent of initial brightness and color for five to 10 years or life of substrate. When we discuss life of substrate in the clothing world, we'll talk about lasting 30, 40, 50 washings, going into the dryer.

When we talk about things going on a hard surface, such as a bicycle, we're out in the elements. We have to have UV stability to maintain our properties in the sun. The material must withstand smog, must withstand all the elements of today's environment.

The adhesion or bonding maintain the form and adherence throughout durability life, and when a

product is applied from a safety factor, it must maintain it's application. And this comes back into where do we apply materials, how do we apply materials and what is going to achieve the desired goal. The compatibility of materials to their substrate. If we're going to a hard surface, we'll probably look at thinner, more flexible films. If we're looking at a fabric, we may look more towards fabrics.

Technology is flexible. All are possible today. And then finally the last two areas I think deal more with reality, light weight and integration. Any treatment or use of reflective technology must integrate well to the application. The bicycle is a consumer product today. Consumer products are generally driven by style, by fashion, by price point. And we must be able to integrate technology into that to not only achieve the safety goal, but also achieve a consumer goal of having a product that people want to buy.

Next slide please. In looking straight to reflective technology, what you're seeing on this chart is different values of brightness at different entrance and observation angles. The entrance angle in blue is at a five degree or head on entrance angle. The entrance angle in green is that of a 45 degree entrance angle, which might be considered short distance viewing as you're approaching. As we look at the different types of technology, I just want to point out two different things.

One, is the technology in exposed beads which is a state-of-the-art technology today, using the fabric world. We have head on brightness, excellent angularity, good visibility throughout the whole range of motion. As you look at the process of tube

technology or canted (phonetic) tubes, tube technology, you have that which is uniform and that which is canted.

Canted cubes means setting cubes off center so that you achieve not only good head on brightness but angularity, better visibility throughout the range of motion. Where technology is heading is making the cube technology more effective at providing greater angularity similar to that of the glass bead or the sphere.

So as we look at the change in technology, the application parameters are there. The flexibility is there. The integration is there. And now it's the movement of technology to a more flexible format and a more powerful format for the cube environment. Next slide please.

I'm just trying to put it all together, the improvement and detection and recognition of cycles of night will reduce accident and injury. And the retroreflective technology has a broadening record of effective action and reduction. We've tried to demonstrate this to the various research reports we've been able to pull from our colleagues in Europe and from that which is available here in the United States.

Also, recognizable image coupled with the broadest retroreflective light return will command the earliest motorist response. You must be able to identify the bicycle and the cyclist together as a complete image. It can't be just one part of it, it must be a comprehensive approach to truly make them visible.

And finally, 3M is committed to developing state-of-the-art materials and enhancing conspicuity and continuing to participate in the traffic and personal safety industries. Thank you.

MR. MEDFORD: Thank you. Next we're going to move to Mr. Choi. Is that how you pronounce your name, sir?

MR. CHOI: Yes.

MR. MEDFORD: Mr. Robert Choi is the Director of Vista Lights and Blackburn which is a subsidiary of Bell Helmets. He is an engineer and has been involved in the development of a number of electronic consumer products, including the first solid state safety lighting device for bicycles. His company has been producing and selling bicycle lights and other accessories for a number of years. He's here today to talk to us about the state of bicycle lighting technology. Thank you, Mr.

Choi.

PRESENTATION OF ROBERT CHOI
VISTA LIGHTS AND BLACKBURN

MR. CHOI: Well, since the inception of the solid state lighting device, I think what has happened in the advancement of lighting technology is I think for the first time, at least in the --

A PARTICIPANT: Are we there? Are we all here? That was just a test.

MR. CHOI: I guess you can hear me now? Can you hear me now?

A PARTICIPANT: Try it again one more time.

MR. CHOI: Can you hear me now?

PARTICIPANTS: Yes.

A PARTICIPANT: This microphone is better. The position of the microphone is better.

MR. CHOI: Yeah. It's interesting to hear -- well, we talked about -- we've concentrated a lot on the reflective technology. But as we advance into talking about the lighting technology itself, a point that came to me as that the advancement of lighting technology -- I don't feel that it has advanced a lot in any years that light's actually been in existence.

I think the lights for bicycles actually have been existing since the earliest inception of bicycles themselves. And up to now, I think the one that we're most familiar with, the carbon filament type lights that are predominantly used, has been the similar type that's been used on cycles since then. What has happened with the advancement really with the solid state lighting devices was that there was money to be made actually in the industry.

That, in itself, has pushed a lot of industry, companies to get involved in advancing the lighting technology. And I guess a lot of it that I will be talking about, lighting technology, will have to do with how it relates to the industry itself and where the market is going. I have to say that the advancements of individual types of technology that we have today, a lot of it has due to the market pressures in a sense, where consumers are finding these products to be useful and actually spending money in it.

As a preface to that, that was just a preface. Going into a short amount of time, I'd like to talk about kind of the lighting technology that I perceive. As we look into the lighting technology, there's really two types of lighting. What I consider an active form which I will talk mostly about which is a light source that's provided by the cyclist in a sense. And then you have the passive form which is the reflectors we've been talking about.

And that is the light source that is provided by the viewer, the motor vehicle itself most of the time. And both work in conjunction to form an effective safety device. I do believe that you have to have one with the other in order for cyclists to be effective at night. What happens usually is that the active form, the light source provided by the cyclist is usually the first things that's visible, especially when a cyclist is coming around the corner where the passive form, the reflector which requires a lighting source to be present is not available.

A motor vehicle actually travelling at 30 to 40 miles an hour, travels, I believe, around almost 25 to 40 feet per second. So within a very short period of time, you can come upon a cyclist very fast so that you need to first recognize that there's a cyclist there which I think the active form of lighting provides an early warning device. And if the light, your projector beam on the motor vehicle actually hits the cyclist, then the secondary form often can, reflector can overcome and even be brighter than actually the active form of lighting.

When I talk about lights, I think of two types: primarily the headlights which usually are white lights used in front of bicycles to really identify a direction and visibility. And then we have tail lights or what we've now coined in the industry as almost as a safety light, a general safety light. Amber, it can be done as amber, white, red lights and used to identify cyclists from other motorists.

I'd like to, as we go on to this, I'd like to talk a little about actually factors to consider in choosing the type of technology and is the following, really. One is the brightness. The brightness, the amount of power that the light is exuding depends, from a marketing standpoint, also from the safety standpoint, depends on the purpose of the light. We in the industry kind of categorize two types of lights. One is actually to be seen. And the other is actually to see.

You can get injured one, by hitting -- getting hit by a motor vehicle or an object. Or the other is actually avoid that object by actually being able to see well. Portability. As a cyclist, you're always conscientious about the work you have to do in riding a bicycle. And so there's many factors in designing lighting technology for bicycles.

Now this is a key one. To design an effective light, it also has to mount on a bicycle. It has to be appreciated by the consumer so that he doesn't feel like the weight or the size of the product outweighs -- the disadvantage of that outweighs the advantage of safety factor. Durability. Durability is a key factor also because bicycles are susceptible definitely to shock, to moisture. And really now with the advancements of mountain biking which has really brought forth -- which has given the cycling industry a second life in a sense, have also advanced the lighting in the lighting technology a great deal because now that cyclists are not only being on the road but actually using their bicycles to go on the trails at night which there are no street lights available so you have to have very powerful source of lighting.

And last is a cost. A cost consideration for a consumer is an important one because you can see that a battery-operated light -- somebody who is buying double A, triple A batteries or a C size battery and using it only for -- if you can think about buying four C cells or two C size alkaline cells, buying them at three to four dollars and only getting anywhere from two to eight hours out of it, it is, for most people, that's not a very palatable thing to spend that kind of money on lighting when you only get a couple hours out of it.

And I really appreciate actually the comment one of our gentlemen had made about often the accidents are happening to people who actually cannot afford to have lights on their bicycles or are careless enough that the cost factor is definitely an important one. The lights actually cost -- the cost of lighting actually ranges anywhere from mass merchants of five dollars all the way up to very advanced light systems that cost well over two hundred dollars in retail. So it ranges tremendously, depending on the type of performance that you're looking for.

The most common type of lights that we're very familiar with is really the carbon filament type, a tungsten filament, also known as incandescent bulbs. They're

generally used for front lighting. They emit a while light source. A difference between a white light in the sense that a white light actually has all the wave length, nearly all the wave length, a visible wave length combined. So that if you put a filter in front of it, it will actually emit that color versus -- I'll demonstrate some of the other technology, solid state lighting devices, which only admit the actual wave length themselves.

So if it emits a red light, it won't -- if you put a blue light lens in front of it, it will still emit a red light. One of the definite advantages of this carbon filament type are that they're omni directional, they're not in the sense that a light bulb lit basically will shine in all directions. Considering all the things that are available, they're very bright. But disadvantages, it requires a large amount of power source. As you know, incandescent bulbs are only little less than actually a 10 percent efficient.

And that means most of that light is actually given away to heat. And so in order to power that, you require a lot of power source. They're delicate and susceptible to mechanical failure because of a filament. They're a mechanical device in a sense. And last, we talked about this as expensive to operate.

Carbon filament type wattages actually vary anywhere from one, actually less than one watt, to all the way up to systems now combining -- oh, you can get well over 30 watts. If you compare that to automobile lights, automobile lights range anywhere from 40 to 70 watts. And I think some of the Swedish automobiles all the way go up to a 90 watts per lamp. So when you're emitting light, most common types are only about one watt or less.

That is as a cyclist, you definitely have the disadvantage over an automobile. What I'd like to do now is actually demonstrate a little bit. I just brought some products with me so that you can get an idea of what we're talking about when we're discussing the type of lighting.

The most typical type that are common as a headlight -- and if I can turn the light down in here so that they can get an idea. Is that possible? Maybe I can -- is this unit is a one and a quarter watt light, very typical of the wattages that are available as an after-market device. The bulb type is -- as we talk about, is the halogen type. There are three types of -- generally speaking, three types of bulbs.

There are halogen. There are xenon and krypton in arrangement of actual brightness.

Now the amount of projection that the light actually appear on the road -- to get an idea, looking against the wall here, it doesn't really project, in a sense, enough light to actually see very well. And lights that are generally lower than two watts is very hard to even overcome street lights to actually see. So most of the time, the battery-operated lights of this nature are generally used to be seen.

And so the industry itself is working very hard to have a balance of between a light that you can actually see with and a light that you can be seen. And so we consider lights like this which retail for under $15.00 are, in a sense, are not necessarily just headlights, but primarily used for safety. One, is to overcome our safety laws that we are -- the light laws that we have that must be visibility of 500 feet. You could probably see this at night. Very close to -- actually you can detect it way up to about a half a mile for a wattage, a one-watt light.

This company was a Japanese company that manufactured this, probably advanced this lighting quite a bit. The halogen technology advancing from the automobile business provides a very white light source. They have what they call a color temperature of the bulb. It's near 350 to 400 degrees of the filament. And it provides a very white form of light versus a yellow, yellowing form.

Some of the things that they're doing to make it even more visible is as we talked about the type of traffic accidents that actually happen, one is from the side view. And you can kind of see it a little bit where they've provided a form of a lens to that you can project the light forward as well as have side visibility.

We think this is a very important factor because just experience dictates that most accidents happen during when the car is turning into your lane or going in through an intersection. With that, there's other lights that are coming that address that issue using a little more higher wattage and addressing the visibility issue.

As you can see, the light that I'm holding on the right is about two-and-a-half watts. The disadvantage of that is that the run time of the product is lessened by that same factor, almost by a half. But what it does address, as you can see as I turn from one side to the other, the visibility of it on the side view is still there as well as from the front. Almost even at right angles, you can still see the light as well as you can

see it in the front.

That has to do with a couple of things. One is the amount of wattage, the power that you're actually exuding. And the more wattages actually you throw out, the further it's going to be visible. But the other is that the reflector on the reflexes that are utilized. And one is, as you can see, is a center beam. It's not necessarily as bright. But what it did was it's a little harder to tell in here. But there are condensing beams that are available on the side that provide that kind of visibility.

What it does is takes an omni directional light and then condenses in a sense to little slices, little slices all around so that the visibility can be enhanced in an omni directional fashion. Another type is a light that actually utilizes ability to focus so that it can be enhanced in different kinds of riding conditions. What that does is, for example when you're riding in traffic when there aren't a lot of automobiles and in a country road where there is no street lights available, one may actually want to condense the light itself and project it out further. And you're primarily using the light to be seen, I mean, to see.

But when you're in city traffic, what actually you do is you enhance the visibility by increasing the angle that way. And what happens is this little -- is it possible to kind of turn the lights down? It'd be kind of interesting to show the beam by actually --

A PARTICIPANT: You want it entirely off?

MR. CHOI: Right. Is it possible to do that? One is that you'll actually see the beam pattern this way. And it provides -- this is a two-watt light. And you can kind of get an idea how much light that actually it's projecting out there. It's enough to actually see in front of you traveling at anywhere from, you know, three to five to up to 10 miles an hour. But it' not to actually overcome street lights. But when I do increase it wide like this, what you see out there, the outer edge of the beam, actually projects a light almost up to the level of the automobile.

And so when I show it like this -- and you'll notice that even a two-watt light is extremely -- it's fairly visible comparatively speaking, when you think about automobile lights that are into anywhere from 30 to 70 watts. While we have the lights off, I'll show you -- I'll demonstrate some of the other forms of light and how

much power does play in the visibility of the product.

Now this light and this light here is internally powered. But when we go to externally powered lights, this represents 10 watts. And you can see it's extremely bright. And it's visible. When you're actually looking at it, it will be as it is on -- here's, you can see it on a reflector. It's almost as visible to as an automobile. And as you can see, it really does light up the road well enough that you can actually see as well as the other lights around the edge, a tremendous amount of light for visibility.

Now when you combine that with these type of lighting that uses external power -- by the way, this is a halogen bulb also. Now you can use a two-beam light like this. And when you see it as a motorist coming ahead, it's extremely bright an effective. And what you can do is you can minimize the power of one unit and often you will turn it on, especially when traffic is near and using both lights.

One, you can use it as a low beam. And the second one can be offset to provide high beam situation. So actually having two lights, as one of the gentlemen has mentioned, can be used both effectively as a safety device and as to be able to see.

I'll move quickly on to some of the other technologies that are available that we've addressed. One is you probably have seen -- and I'm not -- this is what we consider the LED safety lights solid state lighting device. The concept came about almost four years ago, a little more than four years ago. And the primary reason was so that a cyclist can be differentiated from other vehicles on the road. One of the things that incandescent bulbs or filament types have a tough time doing is flashing at a very high rate.

And studies were done where -- this was done by both the Army and the Navy. And there was a basis for this type of patent was that a flashing rate of four to six times a second was most effective when compared with different type of flashing rates. An what we're so familiar in seeing out there are incandescent filament type flashers that are like road hazard lights that flash about primarily a one hertz rate.

Using a solid state lighting device, we're able to flash it. You're able to flash it at a very high rate very close to that effective flashing rate. And what we've found is that very low-powered lighting device which is required for a cyclist, now you can

increase enhanced visibility by adding, in a sense, a motion to it. Now this can be attached, fixed on a bicycle or we have -- there's products that attaches itself to a leg where then you're adding motion to it. And it can be very effective.

The other is that the light also can be attached to -- they're portable and small enough that there are devices that actually attached to the wheel and are spinning in a circle at a very fast rate. And so provide that additional safety. Now these devices also have a kind of a steady mode. Actually, you can do a lot with them. You can strobe it in the different ways. Actually, we found a very effective one is using a combination of a steady light as well as flashing unit in combination.

When that is done, the steady light tends to actually be visible even further ahead. And the flashing unit provides a kind of a motion that also enhances the safety and the visibility. One of the things you'll recognize though with solid state lighting devices, they're fairly directional. And if I turn this light only slightly off, you'll notice that the visibility is decreased tremendously. They have primarily what they speak of about five to 20 degrees of visibility in the -- when you go beyond that range, they say it drops at three DB, meaning it drops in full half of its visible value in about a 20-degree angle.

So not as effective for side visibility and until manufacturers have developed using additional LEDs or the light emitting diodes to provide further enhancements. But there are definitely limitations to these devices because of its angularity.

MR. MEDFORD: Mr. Choi, can I ask you to wrap up, please?

MR. CHOI: Sure. One other thing, this is another direction strobe device, battery operated. It's a xenon strobe. And it flashes actually at about two-and-a-half times a second. Different from a lot of strobes out there is its design so that a moving vehicle can be detected faster than if it was flashing at a slower rate. As you can see, the visibility is almost up to a mile. And I can turn this in just about any direction. I can have this on a side view, and you can still see the product extremely well.

One of the limitations is that it only has about -- running with two double A alkaline cells, it only has about 15 hours of use. Could we have the lights back on? I'll just quickly go through -- could we have the overhead? And beyond the types, I talked about the LED lighting device. They're very low-powered so they only require

anywhere from .06 watts to two.

You're looking at only about .2 watts of output versus what you saw, the incandescent lights that have a full watt to 10 watts. There are other types that I just saw which are the gas discharge types, the xenon flash tube. There are other types that I didn't bring here that's being advanced, florescent lighting, as well as electroluminescence types. Electroluminescence types, you're probably very familiar looking at portable LCD liquid crystal display devices for computers.

They all have their advantages and disadvantages. But I would primarily say right now that the two-type sets are most accepted are the incandescent and the solid state lighting devices. Since the advancement of the solid state lighting device, I estimate there have been about maybe six to seven million units sold in the last four years. So they're worldwide. So they have been extremely well accepted to the consumer level.

Moving on to one of the things that you can't overlook is the power technology. Things that's going to advance the lighting technology is definitely the power required. They are battery operated. There are many different types. They're internal and external devices. The most common type of battery operated are the carbon zinc, what we consider heavy-duty batteries. There are alkaline battery cells. The alkaline battery cells usually have about three times the capacity of the carbon zincs.

And then some of the new batteries that are available are lithiums rechargeable cells. They have become very acceptable, primarily used for powering very high-powered light systems. They are very economical to be used. They can only -- if you chart the use --

MR. MEDFORD: Mr. Choi, would you please -- we really have to move on. Could you wrap up please.

MR. CHOI: Anyways, the only other type that I didn't talk about really is the generator type which is an important one. And what it does is convert the kinetic and potential energy to electricity. As you probably all have played and worked with generator lights, the very most -- they are very common. And for commuter bicyclists, they are very popular and very inexpensive to operate.

One important advancement in making in the generator types battery is actually a combination of rechargeable cells and generator which allow -- you know the big disadvantage of generators is that when you slow down and when you stop, the lights actually go out. But actually the combination of rechargeable cells and generators actually provide a constant source light but at the same time, converting the valuable kinetic energy into an energy source.

Anyways, I'll wrap up. I do have products here. You're welcome during our break to take a look at it.

MR. MEDFORD: Thank you very much.

A PARTICIPANT: Quick question. Is there any evidence that being able to recognize the vehicle as a bicycle has a value?

MR. MEDFORD: Well, I think it's -- I don't know personally. I think that's a working premise that we've been hearing from many people today that we're looking for some standard recognition patterns that you automatically know that it's a bike. It's probably going at a certain speed. And you know what direction it's going in. It seems to be the presumption, at least in part, of what I've heard this morning about it's important to know what it is. You recognize it. You know what it is. And you react to it.

A PARTICIPANT: But this whole documentation --

MR. MEDFORD: Well, I don't personally know. I don't know if anyone here -- we can talk about that.

A PARTICIPANT: There is none.

A PARTICIPANT: Thank you.

A PARTICIPANT: That's one of the important points, too.

A PARTICIPANT: Yes.

A PARTICIPANT: I'll bring it up later.

MR. BUCKLEY: I'd like to make a comment in answer to that. We believe that bicycle recognition is important because it's the bicycle that deviates more so on the road than the vehicle traffic. Bicycles will do things that's not expected. More or less, the vehicles on the road has their own lanes and will do things that are more predictable. So it is important to identify a bicycle or to have the bicycle be known to

the driver.

MR. MEDFORD: I think that's something we can discuss at some length this afternoon, too.

A PARTICIPANT: We need to.

MR. MEDFORD: Yeah. And I think there will be time for doing just that. I'd like to move on now to Mr. William Leppek. Mr. Leppek is currently the Vice President of product engineering at the Huffy Bicycle Company. He's been in the bicycle business for more than 17 years and has been involved in product design and engineering testing, quality systems and international sales and marketing.

For the past five years, he's been the chairman of the USA Bicycle Technical Advisory Group to ANSI. And the purpose of that group is to participate in the national standards making process for bicycles. Good morning and welcome.

PRESENTATION OF MR. WILLIAM LEPPEK

HUFFY BICYCLES

MR. LEPPEK: Thank you. Good morning. I'd like to address this morning the design considerations for bicycle reflectors and lighting systems. And --

A PARTICIPANT: The microphone is low.

MR. LEPPEK: Thanks, Fred. Fred always keeps me on the beam. That was not meant to be a light pun by the way. Could I have the first slide please. This is an outline of the things I'm going to be talking about. The design objectives, any time an engineer has a task to do, he wants to know what the objective is. I'm going to review some of the current state of the art which we've already seen. And I'll try not to repeat comments that have already been made today. But I want to introduce a few new topics such as human factors, other safety considerations beyond the obvious safety considerations in lighting systems themselves and reflector systems. I'm going to talk a little bit about mounting, the power light source, maintenance, long-term reliability and finally, to summarize. Next slide please.

We've already talked a little bit about the two different objectives of a lighting system of a reflector system. And again just to summarize the visibility for conspicuity and the second is rider vision, seeing the road. I think Mr. Choi's demonstration did a lot to help us get an idea what was going on in that area.

But we have to look at, in the visibility systems, that level of visibility that we already have from reflector systems that are sort of the current state. What are the advantages and disadvantages of passive systems and active systems? When considering visibility systems, what combinations of components yield the greatest visibility and under what conditions? And sort of a new topic at this point in the presentation or at this point in the meeting is cost constraints associated with that.

And then finally, what will be the effect of a change or changes made? Will the presence of a lighting system cause more people to be at risk because they will be more likely to ride at night? And rider vision or seeing the road, a look at the various conditions which we've already talked about, country versus city ambient light. What else is back there? The wattage rating that Mr. Choi again made reference to. That's obviously a big effect on how well the visibility system will be effective and the resources, the power supply. Maintenance, which I think will be a huge factor in this right now.

Maintenance is fairly low on a bicycle. But adding a light system to it will obviously have a lot to do with maintenance. Again, cost considerations. Next slide please.

The current state-of-the-art of reflector technology is, of course, in the United States we have the Consumer Products Safety Commission regulations. And I won't go through those in great detail, but I will cover a little bit about that later on.

Getting to other parts of the world, we have DIN standards in Germany, BSI, the British standards. There's Japanese standards. There's Chinese standards. A lot of parts of the world have various standards. And while this not absolutely true, it's generally true the lighting and photometric requirements of the U.S. CPSC requirements are pretty much a model throughout the rest of the world.
There are some slight variation of angles of observation and so forth. But basically, the CPSC lighting reflector requirement is pretty well standard or aligned with what's going on in the rest of the world.

The next point is on size of reflector.

(End tape 2, side .)

MR. LEPPEK: One gentleman mentioned before that a larger reflector may be

more effective than a smaller reflector. And I think that statement is true and false. It's true, given the relative effectiveness of a particular reflector, especially prismatic design. But I've personally been involved with some tests where larger reflectors were less effective than smaller reflectors that were a little bit better in quality and production.

Other influences relative to size in the U.S. versus Europe, fashion is a big part of it. And we've heard that concept before. Because of the usage pattern in the United States versus Europe, for example, where bicycle use is more utilitarian, people use it more for shopping, going to school and so forth. And again, I'm talking about the vast majority of the population.

So fashion is an important factor in the United States. And utility is more of a factor in other parts of the world. Space limitation, a bicycle is not a car, not a truck. And it does not have a large flat surface area. So therefore, any accommodations for lighting or reflecting surfaces must be added on to the bike, either reflector brackets or some mounting surface to provide a flat surface area for the reflector technology to be effective.

We've talked a little bit about color before. And there's -- color addresses both effectiveness and visual recognition. One of the things that we've already recognized, the amber color can be considered more effective than red under certain conditions. And that's something we may want to address later on as part of the standard because right now the CPSC standard only allows red for rear. But I think there is some precedence that with automotive now where some turn signals and some back of a bike, such as the pedal reflectors, also do show amber to the rear.

So if amber reflectors are more efficient, then that may be something to be considered for part of the standard. And again, motion, no doubt about motion, it adds to visibility and conspicuity, the pedals, the spokes. It also has the additional advantage of being a passive system. It doesn't need to be turned on to be effective. Go to the next slide please.

Getting into lighting systems, again I'll go through this part rather quickly. But I thought it was helpful looking at lighting systems to get sort of a reference mark. And we'll start out with a 2D flashlight that you might have in your car or your glove

box or at home. And that's generally about a two watt system. So when you look at two watt systems for bicycles, that's about what it is in terms of power. But as Mr. Choi pointed out, again there's a lot of design changes that are done to the lens to make it effective to light up the road.

And I just wanted to mention this little side note here. One thing that we noticed in the demonstration that if you light up the road in front of the bicycle 25 to 30 feet ahead, that's the best for rider vision. But in test we found that if you align that headlight more with the horizon, that's the best position for conspicuity. You can see that light further down the road, if it's aimed toward the horizon.

And what I've done in this slide is presented some of the retail price points. And the reason this is important to a large segment of the industry is when you're dealing with bicycles that many times retail for somewhere between $60.00 to a hundred dollars, the level of performance and the level of costs you're dealing with is certainly an important factor.

For example, the 35 plus watt rechargeable light system on a hundred dollar bike obviously wouldn't make a lot of sense. And I think we already talked about the strobe lights. And we've been talking quite a bit about the miscellaneous other systems such as LED helmets and wheel strobe lights. So I won't get into that. Could I have the next slide please.

On the human factor safety side, again beyond what we've already been talking about as far as conspicuity and rider vision, I think we have a common goal, and that is to minimize risks to the people riding the bike. And if we make improvements, we have to make sure we don't, in the process of trying to make one improvement, create other hazards. An that's what I wanted to look at here and in that area look at the actuation systems. In other words, how is the system actuated.

The beauty of a reflector system is once it's installed, it's there. It's active. There's no additional requirements to make it work. Generator systems and -- Greg, do you have that generator. I just -- we haven't talked about generator systems. If you can hold that up. That's basically a bicycle generator.

A PARTICIPANT: Pass it around?

MR. LEPPEK: You can pass it around if you'd like to know. Just wanted

people to know what those look like. And I'll talk about that a little bit more. But generator systems to be effective obviously must be engaged as an overt action. Battery systems must be turned on and turned off. They must be turned on to be effective, but turned off to be conserved for the next time it's being used.

Accessibility is another area where risk avoidance has to be considered. I know I've done this myself a number of years ago. We have a front-mounted generator system. I reached forward with my left foot, kicked it on and went on down the road which was great except I was fortunate I did not get my foot caught in the spokes or anything like that. But if we would do that in a mass market situation, obviously, we'd have to consider that then.

The same thing with rear mounted lights or batteries or anything that requires actuation. If the generator is mounted in the back, if the battery-powered switch was mounted on the back, that would have to be a consideration. You wouldn't want the consumer driving down the road, turning around, reach back, be distracted and be at a greater risk.

Another area is wire routing. This is something where you have to consider a wheel entrapment. You have a wire that's hanging relatively loose on the bike. That can't be allowed to lay loose. It has to be attached firmly. I think one time I was also throwing a foot over the bike and got my foot caught up in a wire. It was going to a tail light. Those are the kind of things that one, could be a hazard by themselves, but two, would render the system ineffective.

Handling characteristics certainly have to be considered, especially if you get into the larger systems, the 35-watt systems and you have several pounds of battery packs to be dealt with. You have to have a place to put that. And that should not adversely affect the handling characteristics of a bike. Other things, mounting systems, protrusions. Those sort of things have to be contended with when you deal with probably 16 million bikes a year.

And one other point about utilization and usage is generator systems do cause a certain amount of drag on the bike. And while the majority of the systems, the three-volt systems, I would say don't provide more drag than is reasonable, I've also ridden 12 volt systems that you could almost feel the bike slow down when the system was

engaged.

Next slide please.

Current CPSC requirements -- and these are not the photometric requirements but basically the physical requirements is that reflector must be mounted to it can't contact the ground at any plane. That's just to ensure durability so if the bike is dropped or it falls over, it won't be broken. It has to be aligned within five degrees, must have a distinctive orientation. And the mounting has to withstand a 20 pound force. These are requirements that we live with everyday.

The rear reflectors are about the same. The only stipulation that's in addition there, it has to be three inches below the seat. Side and spoke reflectors must be mounted within three inches of the rim, normal to the plane of the wheel and cannot interfere with any wheel adjustments. Pedal reflectors must be located in the front rear services and must be recessed to be protected. So these, I believe, are all good requirements. Next slide please.

As manufacturers, there are some additional requirements that we have to take into consideration when mounting reflectors. The steering system rotation can't be impaired. In other words, you can't limit how far the steering -- the bike can steer because of the reflector. There's a lot of other accessories such as storage bags, plaques, brake mounting. A lot of these things have to be considered, both in the front and in the rear.

Frame geometry varies considerably. I estimate there's probably more than two thousand bike models made in the United States. So as the frame geometry, the configuration, the amount of accessories vary, also the requirements for reflector mounting varies. On side and spoke reflectors at the time the regulation was written, there was really very few mag wheels, plastic mag wheels, very few disc wheels. These are all technology today that when you get into mounting side spoke reflectors, these type of wheel configurations have to be considered.

And in pedals, to accommodate toe clips or preferred orientations where there's a front and a back to the pedal like in toe clips, those have to be considered, as well. Next slide please.

Mounting systems on lights. Strength and alignment is very critical. One of

the things through the study of some of the European standards, there is a lot of concern is that the alignment is maintained very carefully. You don't want to create an additional hazard by having, for example, that 10 watt system which we could all -- I think when we see that system being shined in our eyes, you obviously, as a bicyclist, you don't want to have a position where you're shining that in the eyes of oncoming drivers, because that could cause a greater hazard.

We have to look at how the lighting system would be mounted, whether it would be mounted to the frame itself or to the steering system. And this again is a challenge that is very similar to the motorcycle industry. Some motorcycles have the lights mounted to the handle bars. So as the handle bar turns, the light turns with it. But others have it mounted to the frame so you get a little less motion on the light itself.

Again, you're going to have a number of different bracket configurations in the many different models that are available. And I think the last consideration for lights is it has to be safe with and without the fixture in place. What I mean by that is that many consumers if they choose not to put the light on there and you have a bracket, for example welded to the bike or welded to the handle bars, they choose not to put the light on there, you have a protrusion causing another danger. That's something that would have to be taken into consideration.

There are combined lights, reflectors. They're integral. Some of the units I've seen would not comply with the CPSC reflector requirements. Some do and some do not. If both lights and reflectors were required on a bike, there would be in most cases a requirement for a double mounting system. You would have to have one system for lighting reflectors, another one for the lights. And the concern there is space availability.

Again, as a bicycle is made out of tubing, it has relatively small frontal and rear surface areas. And so you have to provide mounting for that.

Going on to some other design options as far as dynamo and generators, those can be mounted on the frame, the fork. They generally have to contact the rim. There are systems that drive off the bottom bracket. But I think those are very, very expensive systems but generally have to be mounted to the tire rim. They can be

mounted in the front and the rear of the bike. Then the next consideration are the bolt on or weld on. And most bolt on systems are considered after-market systems.

And most OEM manufacturers, for example, in Europe that mount systems, would provide a weld-on bracket. Then again, the power packs, the location, whether it's removable, theft protection. I believe a gentleman over here mentioned that if you have an expensive light, an expensive power pack on your bicycle, you have to be able to remove that to make sure that it's there at the end of the day when you come back and want to ride your bike and actually use it. Go to the next slide please.

Power source, we talked a little bit about batteries and generators already. The main question about batteries, where you have replaceable, disposable batteries, is will the consumer maintain those? Will the average person go out and make sure that system is maintained so when they do need it, it is ready and capable of being used. If the system has a rechargeable battery, would the manufacturer have to supply ancillary equipment such as recharging stands and so forth?

The higher-powered systems, as already noted, are associated with higher weight and higher costs. And as already noted, one of the key advantages of the battery-powered system is that the power output is independent of speed. When the bike is sitting there at a stop light, the light is on. And that's an advantage. With dynamo systems, you have a lower power source maintenance. In other words, you don't have batteries to replace. You do have higher connection wires, maintenance. Those wires typically can be pulled out very easily. Typically a more component part to deal with, usually a light, tail light generator and wires. And for some of the smaller systems compared to the more expensive battery systems, you do have a lower power output, but again, you can get higher power output from generator systems. You just have to deal with the adverse side effect of feeling a real drain on your -- I use the motor as a rider. And some other disadvantages is that power output is dependent upon speed, no power when stopped. And the speed -- excessive speed, for example, going down the hill can cause the failure of some components. Next slide please.

Maintenance consideration, first, as previously mentioned, riders in the United States, especially in the mass market are primarily recreational. They primarily ride

for fun, most in fair weather and mostly in the daytime. This is contrast to a large part of Europe where it's more utilitarian, more for shopping, riding to work.

As manufacturers, we have to look at what the consumers expectations are. And when it comes to maintenance, they're expectation is really low or no maintenance. They fix it when it's broke. And so when you deal with bicycles, the normal things that have to be maintained, lights -- I'm sorry. Brakes and that sort of thing, adding lights to it would simply add some additional maintenance considerations for the consumer.

Also from the standpoint of maintenance -- and these are probably -- some of these are in use, and some of these are in storage. But things like rain, heat, cold, dust, a lot of the people, as already noted, will not ride in those conditions but many times will leave their bike out in the rain. For example, a child that has a $60.00 bike may be more likely to leave it out in the rain than somebody's that got a thousand dollar bike and has their lights on it.

And mechanical considerations for maintenance. Again, the bracket alignment, which I think is real critical, the batteries replacement and the wire terminations, these are all areas of high maintenance. The other factor is the infrastructure. Currently, there really is not a place to go for most consumers to get replacement lenses, bulbs, accessories for lights. That's very easy to buy the whole unit, but it's not very easy to buy replacement parts. Next slide please.

To summarize, I believe that the reflector system that's currently on the bike has got probably close to a 20-year proven history of being effective. And it is a cost effective way of providing a good insurance policy for bicycles. Designing a system to provide greater visibility and vision at a reasonable cost is a very complex issue. It's not going to be as simple as bolting on a headlight or flash light to a handle bar. It's much more complicated than that.

I really believe that owner maintenance will be a key factor in this whole thing. If the consumer is judged to be willing to maintain a system, then it may be effective. If they won't maintain it, then it won't be effective. And I think question of the day is will the presence of lights on a bicycle encourage people to ride more at night where otherwise they would not. Thank you.

MR. HERZ: I have a comment.

A PARTICIPANT: Thank you, Mr. Leppek. Comments, yes.

MR. HERZ: Roger Herz, Bicycle Transportation Action. I thought it was unfortunate in such a good presentation there was a reference to the fact that most bicycles in the United States were still used for play and fun which I thought was the phrase he used. And while certainly recreation at DMV (phonetic) is still greater than transportation, there has been an astonishing change where up to about four and a half million people use bicycles for transportation which is nine times what it was in 1975.

And I think particularly actions under ISTEA and other actions by the federal government make that somewhat of an acronystic statement.

MR. LEPPEK: I think what you said is true, and what I said is true. I mean, there is no doubt that riding bicycles for the purpose of transportation is increasing. And that's great. But still, when you look at the hundred thousand or so -- I'm sorry -- hundred million bicycles in use in the United States today, I think it's pretty clear the vast majority are used for recreation.

MR. HERZ: There's also a question of definition. While it's changed somewhat, it used to be that one biked to the park to softball. That was a recreation trip. If one drove a motor vehicle to the park to play softball, that was a transportation trip. Fortunately, that is changing somewhat but not entirely. And I think that frankly that helps to reinforce part of your presentation, helps to reinforce the idea of some that bicycles are toys.

MR. MEDFORD: Yes, Mr. Forester?

MR. FORESTER: I take it we're going to discuss all three of the presentations?

MR. MEDFORD: Yes.

MR. FORESTER: Yes, okay. Fine. The ANWB, the Dutch bicycling organization is not known to have much technical competence. Europeans know far less about cycling traffic than we do in this country. And what they do know may well not apply here. So therefore, I'm going to say that with the pattern of bicycle usage that you see in Holland, which is far more what we would call pedestrian style cycling, you might find their statistics applicable to pedestrians but not to cyclists.

I will refer also to the Norway, the Norwegian figures, where there was a great reduction in accidents to pedestrians when they used reflectors. Sure, for pedestrian style use, crossing the road, reflectors are a great help. But they aren't much help when you're riding a bicycle as a vehicle, except from the rear. That's where the difference is. And this talk about reflective tires, they are only side reflectors. And when you see the side reflector, you aren't going to hit him, because he's too far away.

All the arguments about side reflectors say that they cannot alert the motorist at the time he has to avoid the collision, in other words, not run into you, or not get in front of you. Now I think that covers that part of it. The -- Mr. Leppek's presentation was certainly a valid consideration of a whole lot of matters which must be considered, no question about it. However, I'll make this point. He says that the reflector system is cost effective because among other things it needs no maintenance.

Here's what I will tell you. If it doesn't work, it's not worth anything. You're going to have to have head lamps. Somebody who's going to have to put on head lamps -- and I don't think the bicycle manufacturer should. I don't want to put that load on them, because there needs to be, as we've seen, selections by the user. But if people are going to be safe when cycling at night, they must have head lamps. It doesn't matter how difficult it is.

In Europe, parents do the maintenance for the kids. They going to have to do it here if they let them out at night on a bicycle. So, therefore, you have to assume that whatever the system requires -- and we'd like it to need less maintenance, no question about it. Better quality systems need less maintenance. But it's going to have to be done by somebody. If it takes adults to do it, it's got to be that way. Thank you.

MR. MEDFORD: Down at the corner.

A PARTICIPANT: In response to Mr. Leppek's comments regarding generator systems, I'd like to point out that there are generators that function as low drag generators. That's the bottom bracket mount, one made by the Union Company of Germany which is much lower drag, from my experience, than the sidewall mount generator. In particular, that generator can also be remote actuated, that is, by a cable. You can selectively turn it on and off versus having to stop to actuate it as a side

mount one or having to reach with your hand adjacent to the wheel while riding. So that solution is a step in the right direction.

Regarding the need for head lights, as John Forester pointed out, I completely agree that we need head lights for nighttime bicycle safety and that we do need to assign responsibility. That's the parents, and so be it. The issue of maintenance, I think, is overstated. I'd like to point out this is a battery pack available for about $20.00 at any Radio Shack or consumer electronic supply.

And I've found that I can power my five watt lighting system with this for over an hour and then recharge it in 20 minutes. So it's not that technically complex an issue. It's more of a societal choice of recognizing the need to use lights because the technical solutions do exist.

MR. MEDFORD: And I really wonder to what extent that the people what have gotten involved in automobile accidents with bikes really understand what they're risks are as they're riding at now. I wonder if we've really ever gathered that kind of information. I think many of you that are involved in nighttime riding all the time are very familiar with risks and have taken great steps to minimize that risk. Yes, sir.

MR. FORESTER: I'll just simply say that the reason the low drag generators work is they've got a larger drive wheel.

MR. MEDFORD: Probably.

MR. FORESTER: You take the one that was handed around here, put a 35 millimeter drag wheel on it, it works for American speeds and it's half the effort to push.

MR. MEDFORD: Yes, good point. Yes, sir?

MR. BECK: Kirby Beck again here. One thing I wanted to remind people about is we've seen a lot of technology here, but I would like to remind people that some of this technology isn't even legal under a lot of state traffic laws, for example, that flashing LED flasher. In most states in this country it's illegal to use it technically.

Now hopefully, police in their wisdom and common sense are not going to give you a ticket for it, but the fact is it's illegal.

We see the helmet-mounted headlight over there. The survey I alluded to

earlier said that a lot of people find helmet-mounted headlights a real aid in their nighttime riding safety.

Not only can they direct the beam where they want it, but they'll direct it in the face of drivers to attract their attention and make sure they're seen, and they're wonderful. But in a lot of states you can't have the headlight on just your helmet. It's got to be mounted on the bike to be legal.

We've talked about the fact that amber reflectors are wonderful. In most states amber reflectors are not going to be legal. So I guess my point is I think one of the things that needs to come out of this is amending the uniform vehicle traffic code which most states base their traffic laws upon and catch that up to where technology is because I think it's foolish that states do not allow a vista light, for example, to be used legally. It's silly.

MR. MEDFORD: Yes. That's a very good point. And it's my understanding that every state -- I think you said almost every state has in their law a requirement that nighttime riding have a light, but the enforcement of that law is very spotty at best. Yeah. I wanted to ask the 3M people about their preposition at the beginning of their statement that we really do need to standardize the reflectivity that's on the bike and, to the extent that you can, the rider itself, too. And what is the hypothesis behind that? Is it simply that the recognition of a bicycle is important to the person that's looking or approaching the bicycler in an automobile, for example?

MR. BACON: Let me first comment. I would like to expound on Mr. Forester's statement if it doesn't work, we shouldn't use it. CPSC regulations regarding the brightness specific angles on the spoke reflectors are set up. There's finite numbers for measurement.

But we have tried to duplicate in sheeting and put some sheeting on a wheel that didn't have spokes. We couldn't use a spoke reflector. I could not understand. I measure brightness every day. I couldn't understand it. So John Preston had sent me a letter to clarify -- at least it was a letter that clarified, and it was to the spoke reflectors, to be mounted in their most favorable orientation and make the measurements.

Well, if you take a spoke reflector and turn it 90 degrees, you can't even see it

at the angles that the measurements required. So there's an example of it. It's an approved reflector, but it doesn't work.

MR. MEDFORD: Doesn't work. Yes.

MR. BACON: At certain angles. So a manufacturer just needs to make something to meet the specs. But in the real world, there's a lot of times it just goes black. And whether the validity of the reflector is there or not, if it's not doing its job 100 percent of the time, should it be there? The answer is no.

MR. BUCKLEY: This is Larry Buckley. I would like to, you know, talk -- you know, our premise is based on that detection and recognition are important. A driver must detect an object in front of them in enough warning to start making decisions and then to recognize that object. And that requires that -- there has been studies done that have shown an active light source provides great detection.

It doesn't provide recognition. It doesn't define what that item is. I think that's where we can take away from some of the European studies which have said that they have found something to work for them.

Now we may not agree with that, and that's fine, but I think the take away from that is that there are things we can look at that possibly provide good recognition, and that should be part of the mix. What provides detection? What provides recognition? Does the total mix make for a safer cyclist?

MR. MEDFORD: Okay. Yes, sir?

MR. BLOMBERG: I think we'll get into the discussion later of recognition.

MR. MEDFORD: Yes.

MR. BLOMBERG: So I've got some thoughts on that, but I won't go into those in detail. But I just think it's important to note that recognition is not an inherent property of an active light source or a passive light source. It has an educational component. You can make anything recognizable if it's a unique signal in the environment. So we shouldn't think of it in terms of lights are recognizable and some other signal is.

MR. MEDFORD: Yes. Okay. My own personal experience, two and a half blocks up the street here is Wisconsin Avenue, and I go home to the south on that street every night. And that's sort of a major artery here in Washington.

And what I see and begin to recognize clearly are these LED flashing lights that we saw (inaudible). And when I see those, I know there's a bike rider on the street. It's taken me a few weeks to realize what that is, and they have them everywhere. They're not in the same place.

But when I see that red flashing light, I say, "Oh, there's a bike. I better be careful." So I think there must be a learning component that goes on with recognizing what the lights mean. Yes, sir, down at the end.

A PARTICIPANT: This may be directed a little differently. If you associate the LED or whatever it is with a life and not a bicycle -- if it's a pedestrian carrying it -- I have one, and I won't get it out and flash it at you.

MR. MEDFORD: Yeah.

A PARTICIPANT: But I use the one that mounts on the seat post because those LEDs are, as mentioned, directional. And if you get it on a backpack tilting up in the air as you bend forward or whatever, it's totally useless.

MR. MEDFORD: Useless, yes.

A PARTICIPANT: But carried in a hand that becomes very effective, as does the reflective material if you're walking. And so if we can recognize that we have a person there to be avoided, even if it's a dog, the point is you don't want to go after it, right?

MR. MEDFORD: Right. Good point. Yes, down at the end again.

MR. MACKAY: Speaking in terms of the recognition needed of cyclists at night, I would like to point out that if we're going to address some of our urban air quality, noise, congestion, fossil fuel reliance problems, we need to make it safer, easier for people to bicycle, particularly their sense of personal comfort, that they can see where they're going, that they can see that other motorists will see them.

And I support the need for better lighting requirements. Typically, lights are specified as being visible from a certain distance away, oftentimes, 5-600 feet ahead for a headlight, as opposed to an actual illumination value reaching the ground in front of the cyclist.

So I would like to think that we could provide a better level of specificity on that lighting, and in particular, perhaps as a League American wheelman, now

bicyclists have pointed out perhaps a standardized mounting system as is used in other countries so that you can attach a number of kinds of lights depending on your actual application or if you borrow someone else's bike, for example, so that you know there will be a mount on that bike where you can slip in a quality light that provides the illumination you know you need regardless of who made the bike.

So perhaps we need something along the lines of an interchangeable headlight system that can also function when not in use on the bike as a high quality flashlight so that you would have better overall value knowing that you have the function of a flashlight, and no matter what bike you go to use that light on, you will have the full service of it.

MR. MEDFORD: Yes. Good. We'll take one more question, and we'll have much more of an opportunity after lunch. But if we don't break and get to the restaurants in the area, you may have some time problems with that. So, Mr. Forester?

MR. FORESTER: I think on the row here we've had a somewhat misunderstanding about what is meant when you say that side reflectors don't work. It's not the angle of the reflector.

The point is that no reflector will work unless the motorist headlamp beams shine on the reflector at the time the motorist has to take action to avoid the collision. Side reflectors don't work because the motorist headlamp beams don't shine anywhere near the cyclist at the time he's got to do that. It's not a question of the wheel angle or anything like that.

MR. MEDFORD: Good point. While you're at lunch and thinking about what we're going to do in the afternoon, I would ask you think about specific recommendations and suggestions that you would make to address the nighttime riding problem from much of what we discussed already.

But be specific in terms of your recommendations and about how that might be implemented, and part of the how is the who. So as you're having your lunchtime discussions, hopefully the afternoon session will be pointed enough so that we can walk away with a number of very specific suggestions.

In your packet there is a list of restaurants that are available. It's a small list.

But if you go out the front door of this tower of this building and turn left after you get off the elevator, Wisconsin Avenue is to the north and the directions that are in your packet provide a list of restaurants for there. We'll be back at -- we said at 1:30. Why don't we make that at 1:40. Thank you.

(End tape 2, side 2.)

AFTERNOON SESSION (1:40 p.m.)

MR. MEDFORD: If everyone would take their seats, please, we can get started again. Thank you.

This afternoon we're going to get started in the policy session of the meeting, and our first speaker is

Mr. John Duncan. Mr. Duncan is the president and chief executive officer of Murray Ohio Manufacturing Company, one of the major domestic bike manufacturers.

He's the former chairman of the Bicycle Manufacturers' Association and is here today to speak on their behalf. So, Mr. Duncan, welcome.

PRESENTATION OF JOHN DUNCAN

BICYCLE MANUFACTURERS' ASSOCIATION

MR. DUNCAN: Thank you, Ron. Ladies and gentlemen, it's my pleasure to summarize the position of the three bicycle manufacturing members of the BMA, the Bicycle Manufacturers' Association of America.

Along with Murray, those three companies are Huffy Corporation, who is represented today by Dick Molan, their president and chief executive officer. Dick is to my right -- and Ed Shake the president and chief executive officer of Roadmaster Corporation.

And Kirby, you think you're a low-budget operation, I don't even have black and white slides.

(Laughter)

We do have a printed position paper that we have left with you that's on the tables. My three companies produce approximately 95 percent of the bicycles made in this country, and we account for two out of every three bicycles that are sold every year. We sell almost exclusively through the mass merchant channel of distribution, including such stores as Wal-Mart, K-Mart, Toys R Us and Sears.

Our average retail selling prices are under $100 with a significant portion of our sales being under $80. Our customers are extremely price conscious. Those riding our bicycles are predominantly children and casual adult riders. That is a group that you might refer to as recreational cyclists.

A first principle of any business is that you have to know your customer, and

it's a basic recognition of who our customers are that most determines our perspective on appropriate strategies for addressing the risk of night riding.

Many in the cycling community, for example, groups representing the interests of bike commuters and other serious cyclists, if I can call them that, as well as perhaps some manufacturers of bicycles and bike lighting equipment catering to those consumers have different customers and may very well have a different perspective on this issue.

We certainly understand and respect their viewpoint, but again, our own handling of the issue has to be based, first and foremost, upon a recognition of who our customers are.

There are a number of basic issues that everybody here seems to agree upon. The first is that night riding is an issue that should be addressed. There may be debate about the real extent of the risk, but common sense tells us that riding a bicycle at night presents a greater risk of injury than at daylight.

I also think that we all believe that more can and should be done to reduce that risk. We even seem to agree that the best way to reduce that risk is to find ways to ensure that anyone riding a bicycle on the road at night employs both reflectors and lights.

The only question then is how best to get there. There appear to be two basic routes, require manufacturers to install adequate lighting systems on bicycles as original equipment or work to educate consumers about the hazards of night riding and the need to use lights when riding at night.

We strongly believe that the second approach is the more appropriate one. If we knew that the great majority of cyclists ride at night and that adequate lighting systems could be installed on bicycles at the factory at relatively low cost, if we knew that, original equipment mandate might very well be the way to go.

But the evidence is directly to the contrary, folks. The commission's own bicycle survey showed that 87 percent of bicycle owners never ride at night and that only about three percent of all cyclists ride regularly at night. Therefore, a mandate would impose a total unnecessary cost on nine out of every 10 consumers buying a bicycle.

And that cost would not be insignificant to our customers. As Bill Leppek mentioned this morning, even the most rudimentary bicycle lighting system would add at least $10 to the retail price of a bicycle.

That may be peanuts for the cycling enthusiast that's prepared to shell out $500 to $1000 or more for a Tracker (phonetic) or Cannondale. But it is a huge additional cost to the 80 percent of consumers who are our customers and who buy their bicycles for an average retail price of under $100 at Wal-Mart or Toys R Us.

Knowing our customers as we do, we know that they are not committed cyclists who will buy a bike at any cost because it is their chosen mode of transportation or a chosen sport. Our customers are buying fun for themselves, or more likely, for their children.

Furthermore, there is a tremendous amount of competition for that recreational dollar. And it's not just other sporting equipment like skateboards or in-line skates that's the competition. It's video games or whatever other big ticket recreational product that happens to be hot at any given time.

And so any time we face a prospect of any increase in the price of our product, not to mention one of 10 percent or greater, we become very concerned about what that will do to the bicycle market.

And we're concerned not just because we're business people, but because we firmly believe that bicycles provide Americans with tremendous health, environmental and recreational benefits.

As manufacturers, we also have a particular concern about the riding pattern of cyclist generally and our customers in particular. How that might change if all bicycles suddenly became equipped at the point of sale with a lighting system.

Right now we know that almost 90 percent of bicyclists never ride at night. And that's a very good thing from our point of view. Well, we would like to see a lot more Americans on bikes, believe me. We believe that the risks of night riding are such that any increase in the number of cyclists riding at night, even properly equipped will mean more injuries.

At least one of the reasons for the low incidence of night riding, we believe, is that most bike owners have common sense, and they realize that it is dangerous to ride

at night, particularly without lights. They know their bicycles are not equipped with lights, and so they choose wisely not to ride at night.

Now will that common sense judgement change if every bicycle sold come equipped with lights? We think there is no question that it will and that many consumers who today refrain from riding at night precisely because their bikes are not equipped with lights would no longer perceive a risk of riding at night. From our point of view as manufacturers, such a result would be extremely unfortunate both for our customers and their families and, frankly, for our own product liability exposure.

With this as background, I would like to summarize briefly the factors that we believe need to be considered in addressing night riding and provide you with some concrete proposals that we have developed.

Number one, night riding is an inherently dangerous activity from which most cyclist should be actively discouraged. The factors involved in nighttime accidents are extremely complex and not fully understood.

What is clearly understood is that a cyclist can do everything right when riding at night, for example, use all the required reflectors and install the best lighting system available on the market and still find himself or herself in a one-sided contest with a 2,000 pound automobile. For the vast majority of consumers the single most important night riding safety message is don't do it.

Number two, reflectors should continue to be required original equipment, and their removal must be actively discouraged. Reflectors are an extremely effective means of providing cyclists with dramatically improved visibility at relatively low cost.

Perhaps the greatest virtue of reflectors is that, unlike most lighting devices, they are a passive system and provide protection irrespective of the action or inaction, if you will, of the rider. Reflectors should always be used, and it is particularly important that reflectors not be replaced with lighting devices that do not provide equivalent passing reflectivity.

Our third position, the only appropriate safety equipment for night riding is a combination of reflectors and lights. For the small number of cyclists who choose to ride at night, reflectors alone are not sufficient, and the laws of all 50 states say so.

Lights and reflectors should properly be seen as complimentary elements of a total safety system.

Four, we need to assure that all lighting systems available on the market meet agreed performance standards. Today's lighting market offers individuals low-powered lights costing only a few dollars as well as very sophisticated high-powered lighting systems with prices exceeding the price at which a majority of bicycles are sold at retail.

Many of the very inexpensive systems clearly do not provide sufficient illumination, and some may even be confusing to motorists. The use of such lighting devices could well exacerbate rather than reduce the risk of night riding.

There is an obvious need for the promulgation of a single recognized industry standard setting forth the minimum performance requirements for bicycle lighting systems.

Fifth, mandating lights as original equipment would encourage night riding, especially by younger, less skilled riders. Again, we believe strongly that one of the reasons that so few people currently ride at night is that common sense prevails. It tells them not to ride at night. The bike is not meant to be ridden at night.

Our big fear is the same common sense will lead many cyclists, especially younger riders, who tend to dismiss their own physical limitations, to conclude that a bicycle equipped with lights at the point of sale is, in fact, meant to be ridden at night. That will be an argument for his parents. "Mom, it's got a light. Why not?"

How does a manufacturer like ourselves effectively discourage consumers from night riding under those kinds of circumstances?

Six, the cost of original equipment lights would be prohibitive for the large number of consumers and would discourage cycling generally. The existing CPSC standard addresses the hazard of night riding in an appropriate way by mandating reflectors as original equipment. The all-reflector system provides a high degree of conspicuity at a very modest cost.

Given the very small percentages of cyclists who ride at night, reflectors represent an appropriate balance of cost and benefits. Even the cheapest lighting system conceivable was many times more expensive than the complete reflector

package and would likely push the price of bicycles beyond the means of many lower income consumers.

Our seventh point, mandating lights as original equipment would not ensure that lights are, in fact, used. Requiring lights as original equipment would in no way guarantee that they would be used and maintained in good working order.

In the end, whether lights are used properly or at all is totally within the control of the consumer. Experience tells us that many cyclists will remove what they regard as unnecessary equipment. Clearly then, the key to ensuring that lights are used is effective rider education.

Eight, the key to increasing utilization of lights at night is improved enforcement of existing state laws and coupled with consumer education. We need to bear in mind that lights are already mandated, as I said, in every one of the 50 states. In our view, the legal responsibility to install lights is where it should be, that is on the relatively few riders who choose to ride at night.

But these laws accomplish nothing if they are not enforced by the authorities and reinforced by adequate consumer and other educational efforts.

The action plan of the BMA then is very simple. Two parts of that are contained -- and I'll specify it right now. Also, our complete package, as I say, is available to you.

My company and the other BMA manufacturing members are convinced that much can be done to address the risk night riding in an appropriate and effective manner. Our detailed action plan is primarily aimed at getting the word out about the risk of night riding and the need to employ an adequate and appropriate lighting system before undertaking such activity.

Our two plans, therefore, are, first, we are announcing today all three of BMA's bicycle manufacturers' members intend to affix a warning decal to the top two of their bicycles that will contain at least two concise, very important safety messages. Number one, wear a helmet. Number two, do not ride at night. This program will begin with the '95 model year.

While this may seem to be a small step, it will ensure that two out of every three consumers buying a bicycle in the future will be confronted each and every time

they get on their bicycle with a warning about the dangers of night riding as well as the safety benefits of wearing a helmet.

A more detailed description of the risk of night riding will be contained in the companies' owners manuals, which will also inform consumers of the need to employ lights in the event they do elect to ride at night.

Again, our choice of warning language, of flat out, "Don't ride at night," is based upon our knowledge of who our customers are. I know there are other manufacturers of bicycles here today. I believe Trek and Mongoose is here, maybe others. And we're not saying that that's absolutely the way to do it. It's for our customers.

For more serious cycling, we have a different approach. We know that one of our manufacturers has recently adopted a warning decal that says, "Add lights at night," rather than don't ride at night. And for that manufacturer's customers that may be a more appropriate message.

But the important point is that these decal programs should help in making consumers more aware of the dangers of night riding and the need to employ adequate lighting. And by getting out the helmet message as well, these programs should help to reduce the risk of head injury from all bike-related accidents, including those at night.

A second related initiative will require the cooperation of others in the cycling community, particularly specialty retailers. Most bicycle lighting devices are sold by independent bicycle dealers who cater to the needs of those serious cyclists.

For the most part, it is precisely these cyclists who are most likely to choose to ride at night. Yet, it appears that very little is being done to promote the sale of bicycle lighting devices at the points of sale. BMA's bike manufacturing members stand ready to work with bike retailers and other interested parties to develop an in-store program to promote the sale of bike lighting devices.

The state of New Jersey's recent experience in accompanying its mandatory helmet law with a law requiring retailers to post signs informing consumers of the helmet mandate clearly shows that such in-store promotional programs can be highly effective at raising consumer awareness of important safety issues. And for retailers

and bike lighting manufacturers such an approach obviously makes good business sense.

To be effective, this program needs to go beyond simply putting up signs saying, "Buy a light." Conspicuous sales displays and store signage need to be supplemented with more detailed educational materials available at the point of sale that will give consumers a clear understanding of the risk of night riding and the specific requirements of state law.

The development of these educational materials should be a joint initiative of manufacturers, cycling organizations and interested state and federal government agencies. We are optimistic that these initiatives and the other proposals set forth in our paper could help to significantly reduce the risk of cycling at night.

We look forward to working with everyone here to make these proposals a reality. Thank you for your time.

MR. MEDFORD: Thank you very much, Mr. Duncan. That was very interesting. We're going to now call on Mr. Gilbert Clark.

Mr. Clark is currently the executive director of the League of American Bicyclists, which is a national organization of bicyclists founded in 1880. Mr. Clark has been an executive director of the League since 1991, has participated in bicycling at many levels. He's also been an advocate and was appointed by the governor of Maryland to the Maryland Bicycle Advisory Committee and has participated in a number of amateur races over the years. Welcome.

PRESENTATION OF MR. GILBERT CLARK
LEAGUE OF AMERICAN BICYCLISTS

MR. CLARK: Excuse me. I'm not walking away because of a bad introduction.

MR. MEDFORD: Oh, okay. I'll try again if you'd like.

MR. CLARK: You didn't insult me. I just forgot some material over here. Thank you, in fact, for that introduction, and it's a pleasure to be here today.

My talk today is going to review a couple of things. One, I have put some copies over here on the table of the slides that are going to be up on the screen momentarily. Here they are now. Thank you.

The information here -- the recommendations that are going to be made by the League come primarily from a document that was printed about four years ago called "Lighting the Way Ahead." I think it's probably the most extensive publication on the subject of lighting, and it is available from the League office.

Also, earlier Kirby Beck mentioned that we had done a survey over the last month using America Online, and we did get responses from approximately 200 serious bicyclists, I mean people who are commuting, and got quite a bit of feedback from them. And some of those suggestions were utilized, and the combination of a number of these kinds of recommendations then went into the overall document that I'm going to talk about today.

First of all, on the screen you'll see an overview of nine points that I'm going to talk about today. First, in the view of the League, standards are currently silent or inadequate in key areas in this area and should be developed.

Secondly, state laws are very inconsistent and sometimes inappropriate. Third, bicycle manufacturers have not provided consumers with adequate information on night cycling in the past although it does seem as if at least a portion of the industry, based on the last talk, indicates that there is some recognition that this area needs to be improved.

Fourthly, quality bicycle lighting equipment is too expensive. Fifth, there is a lack of consistent knowledge and behavior on the part of cyclists regarding night riding. Sixth, police enforcement of bicycle lighting laws is inadequate or virtually nonexistent.

Seven, we support the effort on the part of, in many states, particularly instituted or instigated by Mothers Against Drunk Driving and others, to reduce the incidence of drunk driving, and we think that these efforts should, in fact, be increased. Eighth, street design and maintenance is a significant factor in contributing to night cycling safety and greater awareness of these problems are brought on by (inaudible) is working in the right direction.

And lastly, our sort of summary recommendation is that we would agree with the BMA that bicycle lights as mandatory equipment is not recommended. Next slide.

Going into more detail on each of these points, our first recommendation in the

area of standards would be that the CPSC should adopt the standards of the ISO or other appropriate standard-setting organization as they relate to bicycle lighting devices.

Secondly, the CPSC should examine the current reflector standards to permit a red or amber rear reflector. They already, of course, mandate a red but should be allowed to permit an amber reflector, possibly even mandate amber and replace instead of red a brighter rear reflector, which could be accomplished by making the reflector larger or having one that has a greater surface facing directly backwards than the current standard.

C, the front reflector should carry some kind of a warning label that it is not a substitute for a light. D, wheel reflectors need to be re-evaluated in light of some of the things that we have heard today.

And I've added an E based on what I just heard which is that we may want to look at regulating what kinds of stickers and warnings go on bikes so that there is some consistency there and so that we do not overstate the case. For example, I would be somewhat concerned about a sticker that said, "You should not ride this bike at night," but I'll get into that later.

Thirdly, and again, this is something that came up a little earlier that the commission should require a universal front light mounting bracket. Fourthly, that the commission should develop a requirement that materials sold on the basis of their reflectivity or retro-reflectivity maintain their qualities when they are wet.

The uniform vehicle code has some problems as well in that it should be amended to allow amber as well as or instead of red reflectors, and there should be a requirement that front and rear lights meet the minimum ISO requirements for brightness.

Lastly, we come to an area that's relatively new, and that involves flashing lights such as the ones that we saw Mr. Choi demonstrate, the Vista Light-type lights, that rear red flashing lights should be permitted.

And we're aware that there is a problem that a number of cyclists are using the white Vista Lights as headlights, and obviously this is problematical, and it does not accomplish the objectives that they might think that it's accomplishing. And they

should not be permitted to be used on the front.

Point number two -- next slide please -- state laws. State laws in this country vary tremendously. This book, Lighting the Way Ahead, sets out all the state laws. There is an incredible lack of uniformity. Most vary in some way or another from the Uniform Vehicle Code, and there should be a stronger effort made to bring them into compliance so that there's a great deal more consistency.

At the same time, bicyclists should be allowed flexibility in meeting legal requirements. For example, reflective ankle bands or shoes that have reflective material on the heel can substitute for pedal reflectors. Equipment beyond the minimum requirements should be allowed, and by this I'm referring to Vista Lights.

And another area of concern is how to handle non-standard bicycle designs such as recumbents, which are becoming more popular, and recumbents frequently do not have areas where some of this equipment can be mounted, and that's an area that needs to be looked at.

Point three, next slide. Manufacturers and retailers have an obligation to become involved in improving night bicycling safety. One area that I'm pleased to say has undergone some scrutiny very recently is the area of bicycle owners' manuals. The Bicycle Wholesale Dealers Association has recently developed a brand new model bicycle owners' manual that does address a number of the issues that I'm talking about here today.

I think that effort may well have been a response to the Darby case where there was testimony to the effect that the manual was not explicit enough in terms of warning against nighttime riding without a light.

Included in the owners' manuals there should be some specific information. Among our recommendations would be that reflectors are inadequate by themselves for night riding, that a front light is not only required by law, but is essential to make cyclists visible to other road users and to illuminate their path.

It should always be pointed out that state laws -- every state requires bicycle lighting and that a bicycle should not be ridden at night without at least a front light and a rear reflector.

There have been some suggestions that pedals that are sold, after-market

pedals, should be mandated to have reflectorization. That would have a serious impact on the after-market pedal business because many of the pedals that are being sold today simply have no place on which a reflector can go.

It would seem to make sense to use that requirement could be very easily addressed by having reflective material built into the heel of shoes that cycling enthusiasts and racers wear. You already have that kind of material in most running shoes today, and it would be an insignificant additional expense.

Thirdly, manufacturers and retailers in particular should encourage customers to be aware that bright reflective clothing is necessary for riding at night, and such clothing should be more widely promoted in advertisements and should always contain the statement that reflective clothing alone is not adequate, that lights are not only necessary but required by law.

Our fourth recommendation is that, relating back to the bicycle owners' issue -- and that is that there is a perceived concern that many bicycle retailers do not, in fact give the manual out with the bike that is sold, or if they do, that they give the wrong manual out.

And there should be much greater encouragement on the part of the manufacturers to make sure that their distributors are, in fact, providing the owners' manuals because it doesn't make any difference what the owners' manual says if the owner doesn't get it.

Slide point four please. Lighting equipment itself -- as was pointed out, bicycle lighting technology has been around for probably 100 years, and there have been a number of significant developments. However, unfortunately, quality lights are too expensive.

I would say that the most consistent concern that was expressed to us when we did our survey was that the cyclists who are commuting on their bicycle find that the lights are too expensive and would like to see the technology -- perhaps if we had more people commuting, there would be a greater demand, and as a result, the technology then would address some of these issues and we would have a higher quality of light at less cost.

That includes, of course, battery technology, which is very expensive,

particularly if you're riding your bike an hour, an hour and a half in the evening every night, don't hold charges long enough and so forth and so on.

We're aware that generator lights would solve a lot of these problems, but then generators have their own problems, and I'm not going to repeat that because I think we've had excellent discussion on that already.

Another concern is that lighting systems are easily removable, and consumers frequently do not have a good place to park or store their bike, and hence, they have to take the lighting equipment with them.

Therefore, we would hope that through some means, perhaps the CPSC could encourage research and development to focus on fixing these problems. Next slide, please.

Bicyclists' knowledge and behavior are certainly a very important ingredient in the mix of bicycle deaths and injuries at night. One other thing we got from our survey is that there is a widely varying perception, even among skilled cyclists, even among people who do this frequently, as to what constitutes adequate conspicuity during night riding conditions.

And one of the things I pointed out already is that there are some folks who don't think they need a headlight but that a flashing white light is adequate. There are folks who festoon themselves, literally look like Christmas trees, probably overdo it, and there are those who underdo it and everybody in between.

I think we need to look at what constitutes conspicuity for a bicycle and get a much clearer definition of what that is, and I certainly hope that the CPSC would do that before embarking on any further regulatory activities.

Having said that, there is also a tremendous need for education in this area, and again, even among the most skilled cyclists there are different interpretations of what constitutes safe bicyclist behavior.

Kirby Beck has mentioned, I think, that most cyclists who are out there doing this on a regular basis have come to the conclusion that they must be a lot more defensive, and that scenario where, obviously, when you get involved in the Darby case and Colin Johnson, the young man who was injured in that clearly was not riding defensively. And education would have had a major role in preventing that particular

accident.

And I'm talking -- of course, Colin Johnson was 16 years old, but this applies not only to children but to adults.

Bicyclists's knowledge and behavior is related to a number of factors, and some of them, which I have set out here, and I won't repeat them because I think everyone is probably pretty much aware of what those are. Okay. The next point, please. Next slide.

Police enforcement is critical here if we're going to really make progress. We can have all the laws on the books, and the Consumer Product Safety Commission can regulate until the cows come home, but it's not going to do any good unless somebody makes it clear that riding a bicycle at night is something that needs to be taken seriously, particularly by law enforcement agencies. There must be an aggressive approach taken to enforce bicycle lighting laws and wrong way cycling.

Again, in our survey, we found that one of the things that serious cyclist fear the most, particularly in college towns, are bicyclists who ride the wrong way without a light. They find that to be the most potentially threatening and dangerous thing that they have found.

Kirby Beck is a member of the Bicycle Mounted Police Unit. The League has attempted to encourage this activity by founding the International Police Mountain Bike Association. We would strongly encourage all communities to have bicycle mounted police because it is a tremendous source of knowledge on this that can be imparted to other police officers who are out on the beat and, hence, develop a higher level of enforcement.

Clearly, point three, community safety campaigns, school, educational programs, need to be involved in after-dark cycling educational programs. Stressing, of course, the point that cycling after dark without a headlight should never be done, never.

Similar efforts need to be directed at motorists, that is enforcement efforts, who drive with defective headlights. And I don't know about you, but I see less and less enforcement in this area as I drive around at night, that there are more and more people with improperly mounted, aligned and functioning headlights than I can ever

remember.

I think maybe this reflects the fact that police have an awful lot to do, and they're just ignoring this. But if the headlights aren't working, the reflectors aren't going to work either.

And fifth, police need to be particularly aware of the potential for crime against bicyclists at night. Point seven, drunk driving -- I don't think I need to belabor this point, but obviously, if half of the people who are killed in the evening and after dark where alcohol is involved, the CPSC could have a tremendous help in terms of curing this problem if we just could eliminate drunk driving as an issue in this country.

Point eight, engineering and planning. All transportation facilities should be able to accommodate cyclists safely at any time day or night, and special attention should be paid to maintenance of curb lanes and shoulders, potholes, pavement separation, drainage grates, bridge separations and so forth and lighting and lane marking.

I also would point out -- I think this has been discussed before -- that bicycle path problems, that is up and down, rollercoaster, severe turns and lack of lighting make nighttime bicycling on those facilities extremely difficult if not almost impossible to do.

Okay. So having said all those things, then we come to the last point, point nine, which is that we would agree with the manufacturers that bicycle lights should not be mandated as a part of the original equipment sold with the bicycle because we don't think it will solve the problem. Most people do not ride at night. We've heard that less than 15 percent of bicycles sold are being ridden at night. Many people, children, for example, in particular should not be encouraged to ride at night.

Currently, lights of reasonable quality are more expensive than many bicycles and are not available to many segments of our society, particularly those who are economically impoverished. Bicycle lighting requires maintenance that will likely not occur in the vast majority of instances. State laws requiring headlights currently exist, but enforcement is virtually nonexistent, so enacting another mandate does nothing to solve the problem.

A large number of people injured riding at night are not likely to be affected

by original equipment manufacturer requirements anyway because they are riding old bikes, and this particularly would relate to, again, economically disadvantaged citizens who are using their bikes because it is the only form of transportation that they have available to them.

And lastly, it does not affect the 100 million bicycles or more which are already being used in the United States. So in summary, I would like to, first of all, address one of the points that was made before me which is that bicycling is an appropriate activity at night for certain members of our society.

In fact, we have federal policy in place today that is designed to encourage more cycling, particularly cycling for transportation, and I refer of course to the (inaudible) and Clean Air acts and other federal legislation. Therefore, we need to do everything possible to make nighttime cycling as safe as it can be for those who need to engage in that activity.

I've already indicated that certainly we would agree that encouraging those who should not because they are not mature enough or have not received appropriate education -- these people should, in fact, be discouraged from riding bikes.

But in general, we would -- again, I would like to thank the CPSC for convening this meeting. I think it's very valuable to shed light -- no pun intended -- on this important issue, and I would hope that we could go forward and make some improvements on the standards which exist because they are outdated.

Technology has gone forward. Federal policy has gone forward, and we need to bring ourselves up to speed and get in line with the rest of the world, which has already figured out that the bicycle is a legitimate vehicle. So thank you very much.

MR MEDFORD: Thank you, Mr. Clark. I think Mr. DeLong wanted to make some remarks.

MR. DELONG: I would like to make a number of remarks on here. I have some agreement with the past two presentations and some very serious disagreements with them.

Number one, I turned 79 last week. I've ridden a bicycle at night ever since I was 12. I just finished in our organization -- as a result of EPA's latest laws, we have to have 1.58 persons per vehicle that come into the plant or the engineering station

where I work. And that's covering the whole area because these are part of the new regulations.

This business of you shouldn't ride at night -- I've ridden I said since I was 12, and I'm 79 now. I've never had a nighttime accident at night, never even -- well, I've had some ones that were close, but the point of it is you learn what to do. And I very much agree with what

Mr. Beck had to say on these points.

There is technology out that is inexpensive, but it's not only good in the nighttime, it's good in the daytime. And Martin Guttenplan didn't mention this in his presentation, although this was brought out by his boss in his own practice and is something that I had noticed also. And that is that the shimmering light -- I'm using shimmering as against flashing.

The figure that Robert Choi brought out was around four hertz. Other figures I have heard from different consultants on this is about six to seven hertz as a proper flashing speed because when you have somebody that's making a left turn in front of you -- I think John Forester can agree with this -- as he is going past, if he's going to make a left turn, he's going to scan. If you don't have something that's going fast enough, then you don't see him at the time he makes his scan.

So a one hertz light which was recommended originally by Dick Blomberg but with reservations in his study for the government is inadequate. A four to eight hertz, however, is not inadequate. Plus the fact that this is not only useful at night, it's useful in the daytime.

A PARTICIPANT: What is that in terms of seconds when you refer to the hertz?

MR. DELONG: Were they hertz?

A PARTICIPANT: Yeah.

MR. DELONG: Four to eight times a second.

A PARTICIPANT: Thank you.

MR. DELONG: Now Dan Burden, who didn't come here, but Martin is taking his place, pointed out to me that he is using his Vista Light, which is around six, seven hertz as I understand it in the daytime as well as at night and he's gotten very

high compliments from motorists when wearing it when he's in very heavy traffic, that just having this shimmering light makes him visible. And he's gotten many compliments from motorists on using it.

I mentioned also this 1.58 persons per vehicle that's now getting into government regulations. To say you shouldn't ride at night, I think is just -- well, I don't want to say what I think it is. The fact that I've had 60 some years experience without having any problems doesn't indicate that it is a problem.

If you have an automobile, and you ride with one headlight out, then you can get picked up. The fact that we don't have our dealers tell the people that this is a state regulation in addition to being one of the manufacturing items -- if you tell them what you have to have, that's another point.

But the point of it is you do have, as Bill Leppek pointed out -- and he had a very good presentation that I want to present to the International Standards Organization, which is now meeting and making up of a new lighting standard.

Back in 1975 to '78 and around '79 and '80 in addition to that, a new lighting standard was being developed by the International Standards Organization. It was made up by a series of lighting manufacturers in Europe. When -- as a member of the committee -- I've been a member of the International Standards Organization Technical Committee from ANSI ever since 1971. That was before 1973 that you've been mentioning here.

This started in the fall of 1971. I've been a member of that ever since that time except for a short time when the United States dropped out when I kept in touch with the people that were on the committee in the other countries.

There are needs for improved lights. At that point, when the manufacturers came up with a new standard at the request of the chairman of our committee, the ANSI TAG, Technical Advisory Group -- asked me to write a paper on that to present.

Remember, we have one vote. It was maybe 15 or 20 nations involved. We have one vote. All the other nations had agreed with this working group standard. As a result of that, one paper, which I have here, that was presented, and our one vote and the presentation of this paper to the international standards committee, ISO committee, caused them at that meeting to nix the manufacturers' standard.

And as a result, there was a new standard developed, 6741 ISO, 6742, reflectors, that was developed the next several years which improved on the manufacturers' standard by a factor of four to one. Now in the rear lap (phonetic) I wanted eight to one as a result of some work that was done by Dick Blomberg over here, Ken Cross, with whom I've been working over these years and --

(End tape 3, side 1)

MR. DELONG: -- of that the British didn't accept the international standard of four to one. They have gone to eight. As a matter of fact, they've gone up to 16 times in a standard rate now that is not yet mandatory.

Now with the shimmering lights, that has been considered as being something that they tell me in this international standards meeting, which, by the way, I presented this at the meeting in Cologne last year, at the meeting in Tokyo the year before.

I had my Hanfolder (phonetic) with two lights on it. One was with a shimmering light, and one was with the same light but in a solid mode that Robert Choi showed today. And what brought it to my attention particularly was going down Broad Street one day to go the Airport with my wife in the car, and there was somebody that had a Vista Light, shimmering light, on Broad Street, which is a six lane street. He was on the far right lane, and both my wife and I had our attention to this light in the daytime. Now, of course, it's effective at night, too.

We've had problems with all the European countries. I'm trying to get a delegation over, and I sure hope that you're going to be on that because if you don't, by December 1st and 2nd is the last meeting of this international committee. They have rejected the shimmering light because they don't know anything about it. What they say to me is what research do you have that shows what the effects of this is?

I talked to both of you folks over there about it, and it's a case of getting some funding. The CPSC is in a perfect position to see that something like this is mandated. We know it's effective. I've seen its effective. I use it myself.

When I was over in Cologne and when I had my Hanfolder (phonetic) there, when I was riding on the bike paths and also riding in heavy traffic, I used that shimmering light in the daytime as well as at nighttime because of its effectiveness in

motion, getting motion.

We've got to get up to date, people. We've got to use this technology. Don't say, "Don't ride at night," when the EPA says get down to 1.58 persons per vehicle. We just had to go through with that, and I'm one of the ones that uses one because I ride the bicycle to work, and as a result, I've kept my health up so that I can keep going at 79 and keep up with all of the younger folks.

I think we've got to stop being negative about some of these things. The international standard is just about to be finally settled. We're getting a delegation over. Mike Rood is going to be over there from the reflector people.

This paper here showed the inadequacy of reflectors under lights and terms (phonetic) as John Schubert brought out a little while ago. We have to have lights. We have to have them enforced. We have to have the dealers put them on. A tag on there saying, "Don't ride at night," is just -- I just can't give you an impression of what I think of that.

MR. MEDFORD: Thank you, Mr. DeLong. We'll get into more of this now. I think that what we had asked for before lunch was that we get specific, and we've done that in great detail. And I appreciate that.

I think that what I would like to do is to open up for some discussion on issues that I have a particular interest in as it relates to CPSC.

And in terms of changing the standard, one of the issues has to do with amber versus red color reflectors, and people have indicated in this room that the current state of the art indicates that amber provides better reflectivity. I'm interested in learning something more about how specific and how much better is amber than red. What data do we have that can be quantified in terms of it's better and how much better in terms of distance or whatever quantification that you might expect. Can somebody in that field give us some information on --

MR. DELONG: They (inaudible) that in the International Standard of 1980.

MR. MEDFORD: Okay. Well, can you give me that data? Yes, Mr. Rood?

MR. ROOD: Yes. The SAE and the CPSC standards indicate that amber typically has to by law be 62 percent as bright as clear.

MR. MEDFORD: As clear. Yeah.

MR. ROOD: And red has to 25 percent as bright as clear.

MR. MEDFORD: As bright as clear.

MR. ROOD: That's because by nature they are so. When they fall within those color coordinates, they are that bright.

MR. MEDFORD: I see.

MR. ROOD: For a given area, amber is about two and a half times brighter than red, and red is about a quarter as bright as clear.

MR. MEDFORD: And was there a consensus that you would like to see the red replaced by amber? There was quite a bit of a discussion about that.

A PARTICIPANT: There was discussion about it. I don't know that there's a consensus.

MR. MEDFORD: Yeah.

A PARTICIPANT: But certainly, it's been brought up because it is brighter in terms of candle power per incident (phonetic) foot candle. The amount of light that hits amber, it returns a brighter return than red.

MR. MEDFORD: Yes. Yes, sir.

A PARTICIPANT: And clear even more so.

MR. BLOMBERG: I think from a behavioral standpoint the jury is still out on whether brighter is better from a safety viewpoint. We have some results from several studies we've done that suggest that the brighter you get, the more confusion you create in the motorist because they detect the target farther away, but they don't know what it is, and they tend to ignore it.

A motorist going down the road is timesharing all the time. There are a lot of targets out there to look at. One of the things the motorist has to do is decide what to look at when. And what we were finding from all of our studies is that the closer you get detection and recognition together, the better off you are.

So just brightness alone may not be the -- and I say may because just as Fred mentioned the one hertz light, we didn't recommend the one hertz light. We tested the one hertz light. That was what was on the market at the time, and it tested pretty well. But that doesn't suggest that is the best design.

I think that amber has great potential, but you have to look at the behavioral

implications as well as the photometric implications before you make a decision.

MR. MEDFORD: Okay. Yes, sir, in the corner.

MR. FORESTER: Okay. I ask that my written presentation be made part of the record first. You have a copy of it I believe.

MR. MEDFORD: It's on the table, I believe. Right?

MR. FORESTER: Okay. I'm going to amplify on that a little bit. First, there never was any scientific justification for the all reflector system, never has been from the very beginning, no matter what the court held or anything else.

At the time that the court made its opinion, the CPSC had certain information in front of it. First was what many of us have been saying today. Side and front reflectors don't work in 75 percent of the car-bike collisions that are probably caused by darkness.

Secondly, at that time, Ken Cross had made his first study, which showed that car-bike collisions day and night from those areas were a very large proportion, something like 95 percent of the total car-bike collisions, reasonable to expect that quite a lot of them had occurred in the nighttime.

Three, in the possession of the CPSC -- at that time the CPSC had a study of car-bike collisions from Toronto. Twenty-eight of those car-bike collisions had occurred at night. Twenty of those 28 occurred from the front area, side or front directly.

The court said you didn't act unreasonably. Well, you didn't with engineering sense. There's a little difference between what is legal and what makes engineering and scientific sense.

After that, of course, came Ken Cross' study, and that was in process about the time that the regulation was last issued. And that indicated, of course, what I've said before, 75 percent of the car-bike collisions probably caused by darkness occur from the front half, and reflectors don't work for that area. What are we going to do about this. It's been said here that we must not encourage cycling at night, all right. The all reflector system encourages cycling at night. Eighty-five percent of the teenage -- ah, yes, the children we're so worried about -- teenage people in northern New Jersey responded that a bicycle with all reflectors on it was safe to ride at night. That's

what they've come to believe over the years because of what the standard says. It's for safety obviously. It's got front reflectors.

If you're going to let people ride at night, they've got to be properly equipped. We don't want to encourage them to ride improperly equipped. The all reflector system has no scientific justification, and it makes people think it's safe to ride at night with just it.

What do we need to do? First, we need to have bright rear reflectors, amber and pointed backwards, rather than sideways as well. Two, we need to have a standard for the traffic safety aspect of headlamps, which is roughly equivalent to the state laws saying five hundred or six hundred foot visibility at night. I don't remember just what that would involve, but that should be the scientific basis for the standard.

And I think that if you tried to make a standard for roadway illumination, the difference in the using requirements are so enormous that you couldn't really do it and come up with any sense. But for public safety, in other words, traffic visibility, we know what that would entail, and scientists can tell us what the amount of light required is. And it can be provided, no question about that, at reasonable rates.

It would be nice to have a standard for a mounting system for lights and for generators, not that it has to be used, but so that those manufacturers who choose to use brackets will have all the same brackets. They can be mounted to the bicycle at any end they like, any way they choose to. But when it comes to putting the lamp on it, if the lamp manufacturer wants to make a lamp which fits the bracket, he knows what bracket to make it fit.

I would recommend that you also consider a standard generator mounting bracket such as detailed in my book, Effective Cycling, which is easy to take off when you get there, but easy to put on properly lined up. Just two bolts, and it's all set and is adjustable over the years as you change wheel sizes or wear out generators and need new ones. And the system which I've got does that, and any manufacturers were able to use it. All that requires, really, on the manufacturers' of bicycles point of view is two holes for five millimeter volts, 30 millimeters apart and at a reasonable distance from the rim. It will work. That's all I have to provide. Everything else is part of

the system.

I think that if we do that, we'll have a changeover to a system which won't encourage dangerous nighttime cycling, will enable those who need or choose to ride at night to do it easily with the fewest equipment complications and, really, no problems at all for the manufacturers. There.

MR. MEDFORD: So let me see if I can restate what I think you said to me. Basically then, in terms of the lights, you don't recommend that CPSC mandate lights but come up with some standard for either CPSC or the voluntary standards industry with brackets for lights and a voluntary standard or a standard for minimum performance requirements for lighting, for lights.

MR. FORESTER: Insofar as traffic safety is concerned.

MR. MEDFORD: Insofar as traffic safety is concerned. And about the aspect of companies deciding to affix labels on bikes about whether or not to ride at night, your view is?

MR. FORESTER: I don't like labels on my bikes.

MR. MEDFORD: (Laughter) Okay. You don't like labels on your bikes. See, the difficulty that I'm having is that even if you do all of that, let's say you devise --

MR. FORESTER: I said one other thing. Do away with the all-reflector system, so you don't have to be --

MR. MEDFORD: That's true. That's right. I neglected to say that. I'm focusing now on the lighting issue. Even if you come up with the bracket standard, and you put brackets on bikes, and they meet certain requirements, and you provide the minimum standard for lights, how do we get people to put them on and to use them effectively? I mean, do we really expect that people will do that?

A PARTICIPANT: Traffic fines work real well.

MR. MEDFORD: But they're not being enforced. I mean, that's what everybody is saying.

MR. FORESTER: It can be done. In England where my parents grew up, if you were out at night without a light, you got nailed pretty darn quick. It can be done in this country.

MR. DELONG: Same way in Germany.

MR. MEDFORD: How do we get that though? How do you make that happen?

MR. FORESTER: That's a social property. But the point is we can't do that until you've got the kind of system I suggest where there's no doubt about what you need, and there's no temptation to go less. Then the police officers themselves are confused about what needs to be done at night just like everybody else. So they're puzzled about what to enforce.

MR. MEDFORD: I thought they simply enforced whether or not you have a light that, I guess, is visible 500 feet away.

MR. FORESTER: Oh, no. They hassle you in the daytime for what kind of reflectors you have on.

MR. MEDFORD: Yeah. I'm sorry. Someone had a comment here? Mr. Guttenplan?

MR. GUTTENPLAN: Yeah. I may be jumping the gun here, but when you asked earlier what we think the CPSC could do, something that's implementable and that could have a large effect, what occurred to me -- and I had this conversation with Greg earlier -- is that the CPSC could provide and produce some high quality video PSAs that go out nationally that visually show on the TV screen what your bike looks like at night without lights and then shows you what an effective light is.

It shows you, you know, what reflectors do, what they don't do. You could go into whatever detail we decide or you decide as needed, but bringing the issue up to the public in a way that reaches people, I think is going to have a greater effect than us arguing over the particular standards right now.

And the details can be worked out, but the point is it's got to be a good production. It can't be slipshod by any means. Otherwise, the TV stations aren't going to play them. But if it's good, if it's something like the crash dummies where that gets recognition associated with it, this issue can become very visible.

MR. DELONG: You're already using this in Florida, aren't you -- what Dan Burden tells me -- in the schools, I mean.

MR. GUTTENPLAN: Yeah. There's stuff in the schools.

MR. DELONG: Right. Yes.

MR. GUTTENPLAN: Yeah.

MR. MEDFORD: There are videotapes that are being used in school that show this at night?

MR. GUTTENPLAN: No.

MR. MEDFORD: No.

MR. GUTTENPLAN: There may be a section in the traffic ed. program that goes into this, but I'm talking about mass public so that everyone who watches television gets this and then print materials that go with it, educational materials that go out to the schools so that each group that we're trying to target gets hit.

MR. MEDFORD: Yes, Mr. Beck?

MR. BECK: Also, one other thing. I've seen over the years different products that CPSC has had some real problems with, and there's been some very high powered press releases in media. And I don't know if the general public understands what a problem nighttime cycling is, but I think certainly the CPSC has power to put together a pretty good press release and media coverage of the problem as the start of the education thing.

A PARTICIPANT: And we'll all help you do it.

MR. BECK: That's right.

MR. MEDFORD: So publicizing the danger of nighttime riding in a big way is one of the recommendations and doing it cooperatively with the people at this table...

A PARTICIPANT: That could go hand in hand with this PSA campaign.

MR. MEDFORD: Right. Right.

MR. DELONG: Showing that it is possible and it meets the EPA regulations which call for 1.58 persons per vehicle.

MR. MEDFORD: Yes? Yes, sir, down at the end. Yes?

MR. ENGLE: I'm Ron Engle from NHTSA, and I've tried to keep quiet for most of the conversation today. But I want to deal with the issue of enforcement since I've got a few years in that thing. And I'm listening to people say if there are laws out, and the police will enforce it, and you feel that's going to happen, I think you're all being a little naive.

Number one, other than Kirby, I don't see anybody here who is in law enforcement. I don't see the IACP, International Association of Chiefs of Police, or the National Sheriffs Association. These are the groups that you're going to have to convince to take enforcement action. Just because the law is on the books doesn't mean that it's going to be enforced, especially in the area of pedestrian and bicycle safety.

And let's be honest with ourselves, guys. We're all heavily involved in these issues we're talking about either on a personal and/or professional basis like myself, and they're important to us. On the scale of one to 10 in traffic safety or criminal stuff, bike and pet safety don't get a full one. And I think we all understand that.

We can come out with PSAs, but without the unified support of the police, I think that we'll spend a lot of money on some PSAs that probably will not be very effective. I propose to you, if you're looking in this direction, that we start working with these people. I think that there is some potential for it.

I think that we can clearly show that the data is there, and we can be persuasive. But right now, we're not doing it. I would also point out to you, and I'm going to spook some of the things Gil was talking about.

But you have to be faced also with some of these issues that CPSC develops the standards. CPSC and NHTSA have got a joint agreement to work on these issues together. Typically, CPSC does not have the resources to do what you're proposing. Typically, NHTSA does.

When everybody is talking about ISTEA as being the savior -- yes, indeed, Congress did give us ISTEA. They want to increase the amount of commuting, so forth, so on, trips by walking and biking. They also wanted to decrease the casualties by 10 percent. But the same Congress that did that also took 70 percent of the funds that would go to pedestrians and bicycling safety and drew them away.

So I think there's a message there from Congress that's just sort of like, "Come here, guys, but stand back." So many of those things that we would have available, and we plan to do this coming year, they're not going to happen. As a matter of fact, we don't have a bicycle safety program for the next couple of years because of recent congressional action.

So I think these are some of the things to do. But clearly, I think you have the people here, but I think we have a few key actors that are not here regardless of whether you come out with standards for lights or marking or any other thing.

And the last thing I want to mention was the fact of helmets. And since I'm heavily involved in motorcyclists' things, I've noticed that one of the proposals was putting the lights on the helmets.

I don't know what standard you're going to come out with, but I can clearly say to you that by putting things on the helmets, that you will make a standard conforming helmet a non-standard conforming helmet and one which, if you did have the misfortune to go over your handlebars, you probably would suffer a very grievous injury irrespective of the fact that it appears to be very effective at putting a light out. If we start talking about light standards, that's something you need to look at.

MR. MEDFORD: Okay. Thank you. I appreciate your comments. I agree with them in total. I noticed in the discussion from BMA, the recommendation that a light standard be developed. And they were going to undertake an activity in which they asked CPSC to participate in development of the ANSI standard. Can someone give me some information about what stage we're in? Is that the ISO standard that you're referring to?

MR. DELONG: Yes. We're already doing this. As I say, I was in on this back in -- originally it was CPSC.

MR. MEDFORD: Yes.

MR. DELONG: When we first sat together in 1971, they brought up this reflector standard, and they increased the capacity of the existing reflectors that were on the market then by a factor of several times.

Their point was in our ISO meetings, our ANSI TAG meetings, that we had developed a lighting standard. We would have to do something. And the improved reflector standard was called by CPSC and worked out with reflector manufacturers so we would have something as an interim gap. It was never meant -- at that time it was stated by your CPSC representatives on the committee that this is not the final standard. Now you never went any further with it, and that's been misunderstood for years and years and years that this is a safety item, that you have to have this, which

is all right.

It's good. It doesn't take any light, doesn't take any batteries. The wires don't break. But it was never meant by CPSC to be a final standard.

MR. MEDFORD: What's not clear to me exactly where we are in the standards development process for lights.

MR. DELONG: The standards development process?

MR. MEDFORD: For lights, yes.

MR. DELONG: I mentioned here that by this paper that I presented, we had the international standard improved by a factor of four to one. After five or seven years, you're supposed to redo a standard.

MR. MEDFORD: Right.

MR. DELONG: The new standard is now underway and by December 1st or 2nd is supposed to be wound up except for reflectors.

MR. MEDFORD: Okay. I believe Mr. Leppek has something to add on this. Thank you.

MR. DELONG: Go ahead.

MR. LEPPEK: Just to answer your question directly, while Fred DeLong is talking about a lot of the work that's been done, there is a lot of work going on in the international arena right now on the lighting standard. But we have not in the United States really undertaken that work. I think the position that was stated by Mr. Duncan was a willingness to pursue that if that seemed to be --

MR. MEDFORD: As a part of the ISO or ANSI domestic?

MR. DELONG: You're contributing in it, Bill.

MR. LEPPEK: Well, yeah. We are contributing. But let me explain just a little bit about the separation. The U.S. Bicycle TAG is the U.S. technical group, and we have our own organization here. That's the group that would be willing to undertake this work.

The international group, we participate in the international standards-making process because we're sanctioned by ANSI, the American National Standards Institute. So we can have a knowledge of and vote on the international standards, but we could really do a lighting standard for the United States separate from --

MR. MEDFORD: That was my understanding of what his comments were going to, and none of that has been initiated at this point. Yeah. I see. Okay.

There was some point that he made that I thought was pretty interesting was that not only should you develop some minimum performance requirements for lighting, but maybe there are some sort of upper limits that really make them unsafe, too. And I thought that was a rather interesting aspect. We're talking about several parts of this.

And I think that developing standards requirements would be good, but their only as good as, you know, the extent to which people use lights. And I think that it would be helpful and probably important to have a standard for lighting if the amount of variability on the market now or for the products there really are inadequate.

So the assessment of the market is that it's really all over the place and not something that meets the need now as most people understand it. Then I think that would make perfect sense, and I would encourage that probably happen. But we can't require people to use them.

And I think you can require them on bikes as manufactured, but a clear consensus from most people in this room is you don't want to do that. It doesn't make any sense. So that's one area that makes some sense to me. Yes?

MR. MACKAY: This morning I indicated that our conversations would include individual choice, social norms and technology. And I think we addressed a number of the technical issues. I would like to point out some of the individual choice and social norm issues here.

In particular, I would like to speak to the fact that there's an entire user group not represented at these tables, and that's children and youths who are not old enough to have driver's licenses. I believe that it would be appropriate for us to recognize that for, say, children under age of 14, the bicycle is the principal means of personal transportation.

I can assure you that I arrive at this table with skills that I gained when I was 14, 15 years old, via a job that I was able to hold only because I had a bicycle, which did require riding my bike home at night.

If we start telling children, "Hey. We don't want you riding your bike at night.

We want you to stay away from bicycles at night," that's going to have impacts on how our children, how our society develops.

In particular, in Denver there are neighborhoods where there are youths at risk for gang involvement. Well, you don't have to go out and look for the gang, the gang will find you in that neighborhood.

If we try and address that risk via programs, scouting, organizations, recreational center programs and other alternatives, providing alternatives to gang involvement to these youth, we need to recognize that they need to get there. And one of the reasons they're at risk for gang involvement is because their parents might not give a care to begin with.

So I say let's make it easy for them. Let's recognize that we want youth to be able to participate in programs, and that involves their own personal transportation.

If you look at other issues, for example, water safety, well, the Red Cross has a program with water safety instructors who can teach children various strokes and other water safety topics so that they can go in the water with confidence knowing how to swim.

We need something corresponding for bicycling. I noticed in point six of the League of American Bicyclists recommendations here community safety campaigns should include information about night cycling. I think there's tremendous opportunities here.

Some of the ways that we can get that message across would include, for example, soap operas. Yes, soap operas. In Mexico, for example, they looked at various ways to encourage lower family reproduction or lower numbers of children in families.

And of all the ways they could do that, they found out by incorporating that into a story line. Gee, we have few children, therefore, better family lifestyle. That was one of the most effective ways to address this issue.

If you look at the way that Hollywood has participated in raising public awareness of drunken driving, again, as a thread in the story line. That offers opportunities as well that might hit the target better than more public service announcements, which, obviously, require production and funding.

Media broadcasters are probably deluged, my understanding, with public service announcements on a variety of topics, and a very well produced PSA on nighttime bike safety might only be added to the mound of unrun PSAs.

So what I would like to recommend is that we consider how the impacts of what's being stated today -- I'm hearing from several sources about discouraging nighttime bike riding -- what impacts it will really have on our society.

And I tell you that because I rode a bike in my first job, I have skills that I'm now using in my career. And I would like to think that we could recognize that for the next generation that they need to get jobs. They need to have alternatives to nefarious activities. And nighttime bicycling might be one of the ways that we as a society can encourage their development.

MR. MEDFORD: Okay. Were there any comments on that about -- I know there's some disagreement about whether or not we should recommend children, and I don't know what age -- you know the one question is, if you say children shouldn't ride at night, what age should that be and what should apply? Is it 16 and older, 14 and older?

MR. MACKAY: Well, if you can't have a driver's license, you're either relying on your parents to drive you around or somebody else to drive you around. So, yeah. Let's say, for example, 12 to 16. Children can participate in activities, do casual jobs and find alternatives for themselves as opposed to some of the threats that are real and immediate in their neighborhoods.

MR. MEDFORD: Yes, sir, Mr. Shannon?

MR. SHANNON: The National Association of Claimants Attorneys about a month ago put out a bulletin that said any encouragement of night riding by children would be absolute liability, and it's kind of a slam dunk in a negligence case. So the manufactures of bicycles are very nervous about that aspect.

MR. MEDFORD: I see. Yes?

A PARTICIPANT: Roger was trying to get your attention.

MR. MEDFORD: Oh, I'm sorry Roger. I can't see you back there.

MR.HERZ: Thanks. I agree with the comments that Jim MacKay made. Certainly we should be able to use education and enforcement as a major tool here.

Very often I find that people want to pass new laws when there are plenty of good laws on the books except they're just not enforced.

And this often boils down to whether you really want to try to fix a problem, which may not be easy, or you just want to put on a good show.

On education there are many tools such as building into curricula for math, english, etcetera, so you're getting two for the price of one. On enforcement there are some things that can be done at minimal cost. For one thing, the more we have police on bikes doing their job, the more this helps to legitimize this as a mode of transportation.

In many cases it's fascinating to me to see the cops on bikes becoming role models for the kids. There are simple things in urban areas -- perhaps not simple, but relatively simple.

The quality of identification being requested and received is very often the key. The object here is not to give out pieces of paper, but to change behavior on the streets, and therefore, a monthly disposition report on the number and percentages of summons cleared, either a fine paid or a plea entered by return date, seems to me provides some very important information. I've got about six or seven other items I could give anybody who's interested.

It's a much more difficult world today. When I was in the second grade, Johnny Samuelson talked back to the teacher, and we all knew he was going to jail. But I think the more we start to see the bicycle as a legitimate mode of transportation, the more there are opportunities for exerting social pressure to change behavior.

For instance, if a police officer sees a violation, whether it be one of the subjects that we're talking about here tonight or running a red light or going the wrong way, if that is ignored, that's sending totally the wrong message. If time precludes giving the summons, or the violation is marginal, at least yell out, "Red light. Wrong way. No light," whatever. I think there are opportunities that we can work together on.

I just want to make sure everybody understands that the point that Fred was talking about is a part of the what is currently called ECO, or Employee Commute Option, which applies to non-attainment areas and I think is going to be a great tool.

I agree with almost everything in Gil Clark's paper, one exception because perhaps I'm an offender. On adequately lit city streets I often use a blinker, sometimes a strobe. What is the point to requiring a non-flashing white front light if there is adequate street lighting?

MR. CLARK: I'm not sure I understand the question, Roger.

MR. HERZ: Well, for instance, I normally use a leg light, red light in the rear, white light front blinking.

MR. CLARK: All right. You're saying that if there is adequate lighting on the street that you use, i.e. overhead lighting, you don't need a headlight.

MR. HERZ: Right. My concern is I want to be seen.

MR. CLARK: Okay.

MR. HERZ: I don't have a problem in most cases --

MR. CLARK: Okay. Number one, you're breaking the law.

MR. HERZ: Pardon?

MR. CLARK: You're in violation of the law, for one thing, because you don't have a headlight.

MR. HERZ: But what is the point to prohibiting that use?

MR. CLARK: Well, secondly, I think that one of the comments, in fact a number of comments that we got from people on that particular issue, was -- is that is really not all that visible. You're not as visible as you think you are.

Particularly, I would think, and I would defer to some of the experts here in a situation where you have a lot of overhead lights, how valuable is that strobe light in the front anyway?

MR. HERZ: Well, I would think it was --

MR. CLARK: And what happens if you enter into an area where it's not well lit? Now you don't have a headlight, so --

MR. HERZ: I agree with you where there is inadequate street lighting. But if one is travelling terrain on a regular basis -- and those in the urban poor where there really is not a problem with that -- it seems to me particularly if you're using a leg light, so you've got the bobbing motion, that the flash adds that much more to your being seen.

MR. CLARK: I would be interested in the opinion of some other people on that particular point, frankly.

MR. CHOI: I mean, in developing these lights, I've looked at it, not from a regulations point of view, but looked at it from a practical point of view. And what Mr. Herz is saying is correct.

Like a xenon strobe that I demonstrated there, I used that in a front light situation. We found it to be more effective than just actually having a front light because a motorist cannot tell the difference, but a strobing light of that nature immediately gets your attention.

And from that point of view, I do agree that when there is adequate street lighting available, that you have to make this practical in that a person -- if they can just at least carry a battery operated strobing light, that is still much more effective than requiring a person to keep a light on constantly.

I talked about the cost issue. A person who buys a light and puts four double-As in, he's got to go through two hours of riding. He's going to spend $2.50-3.00 each time. And that's not a reasonable thing to ask of a person who is commuting constantly.

MR. MEDFORD: The LED lights that you showed us today, how long do they last?

MR. CHOI: The reason for the popularity of that light is it lasted well over 300 hours on two double-As, and most people don't even ride 300 hours in their lifetime of night riding.

MR. MEDFORD: Yeah.

MR. CHOI: And the way that it was designed was that the unit with a rubber gasket built into it -- because of its solid state technology, it's almost hermetically sealed in a sense, and they just last forever. And I can throw that light almost across the room, and it continues to work.

I'm not trying to make that point because I manufacture that light. I would like to see it. I mean, some people are laughing, but the reason for the development for that light came on was for the specific reason I travelled at night.

And as that gentleman talked about down there before, I grew up, and when I

came to this country, I couldn't afford an automobile. So I actually just rode bicycles constantly until I was, like nearly 20 years old. I didn't even have an automobile.

And I saw the inadequacies of lighting systems that were out there, and as I worked as an engineer, when I saw that technology available, solid state lighting, I said it was a perfect application for bicycles. So I think we ought to try to look at the practicality of what we're trying to apply technology to and not just necessarily on the regulation sense.

I mean, if I took the Bicycle Manufacturers' Association position just because it's easier to just put a label on a bicycle, I don't think we would even be talking about actually a lot of lighting systems that are here. I knew at the time that it was manufactured that it was legally not allowed in many states at the time. But I pushed the limit because I felt it was an effective product beyond that, and I knew we had customers who were given tickets.

Now there's definitely problems also with those laws because if you really look at the laws, which we did carefully on all 50 states, they didn't actually mention a difference between a motor vehicle, a self-propelled or self-powered vehicle, whether that light can be attached to a person riding a vehicle. Is that part of the vehicle, or must that be attached to a vehicle itself?

So there are a lot of ambiguities also in that law that, as we looked at it legally, I think there was only really two states that it seemed almost illegal to actually have that product.

MR. MEDFORD: Okay. Yes, sir.

MR. FORESTER: The statement has been made that any encouragement to cycling at night leaves you open to liability. I think that's hokum. First place, to whom? Sure, if the bicycle manufacturer says, "Oh, go out and ride this bicycle at night. It's perfectly safe," maybe yes. But how about the teacher who says, "If you ride at night, here's what you have to do?" Liability? No, of course not.

There's a difference between discouraging, permitting and encouraging. What we are saying is if you ride at night, you must do these things, and if you do so, it's probably okay.

MR. MEDFORD: Yeah. I'm interested in what Mr. Duncan might say about

willingness to put on a label once you had a lighting standard developed. Do not ride at night, or if you ride at night, buy a light that meets a certain standard. Does that still put someone in a situation where the companies don't want to do it? Is the reason for it principally product liability, or is the reason as much that and the fact that your customers, you don't think, are riding at night. I mean, it wasn't clear to me. MR. KERSHOW: Mr. Medford.

MR. MEDFORD: Yes?

MR. KERSHOW: Maybe I could speak to that.

Mr. Duncan had to leave, I'm afraid.

MR. MEDFORD: I was wondering where he went.

MR. KERSHOW: I'm Mike Kershow with the BMA. I'll try to explain our position on this because I don't think it's being properly understood.

MR. MEDFORD: Okay.

MR. KERSHOW: We have as much interest as anybody in this room in encouraging cycling. It's our livelihood. But we also perceive that there are risks involved in night riding. I think everyone at this table acknowledges that as well.

Manufacturers, unlike teachers are faced with a very difficult task. They have to find a way to effectively give information to their customers that allows them to use their product safely. Everyone is aware of litigation that has been filed and succeeded involving this very issue, and it really illustrates the dilemma that manufacturers are put in.

But our major intention in using what appears to many at the table to be a very overbroad statement, "Don't ride at night," is to give to consumers, in as concise and forceful a manner as possible, information about the increased risks of riding at night, again, a proposition that I think most at the table would agree is not worthy of debate.

You could try alternative formulations, "Night riding is risky," or any other variety of statements you can think of.

But for us, particularly focusing, as Mr. Duncan said, on the consumer base to which we largely are targeting our products, it seemed to us the most responsible thing, the most ethical thing, quite frankly, was to put a very direct message that we feel discourages that unskilled, by and large, certainly casual rider from thinking that,

for instance, Mr. Forester's point, just because there are reflectors on the bike, it's safe to ride at night.

We don't believe that. Our owners' manuals, going to the teacher analogy, takes some pains to explain that fact. But if there's any lesson from the Darby verdict, it is that passengers and owners' manuals don't get you very far.

A PARTICIPANT: I don't know how many of you saw that "Blame Game," John Stossil's program the other night in which he discussed the Darby case. And the thrust of it was if there had been a tag on the bicycle saying, "Don't ride at night," they probably would have lost that case.

So I can tell you under no circumstance are we going to give any indication that we want kids to ride at night.

MR. MEDFORD: Yeah.

MR. KERSHOW: One could even foresee a case being made by a very clever plaintiff's attorney that a decal on a bike that said use lights at night could be construed as an implicit invitation to the consumer to get on the bike and use it at night.

We as manufacturers simply will not put ourselves in that position. We would be overjoyed to have the larger cycling community do its best at educating its constituencies about how to use the product properly. And we will do the best at educating our own using --

MR. MEDFORD: How about in the owners' manuals themselves? Is there any information in there about -- the same advice would be provided in the owners' manual for the bike about, "Do not ride at night?" Is that the way it works?

MR. KERSHOW: Well, I can give an example, perhaps, of just a representative statement from one of ours, which again, we think is appropriate for our customers. It takes up about half a page in one of the companies' owners' manuals here. It's a point titled, "Use extreme caution at dusk and at night." It doesn't say, "Don't ride at night."

But here's the detail. "Adults should not ride at night unless necessary. Children should never ride at night." Now I know there are a few people here who have gotten to very ripe old ages riding at night from age 12. More power to them

and continued wishes for health. But we do not want to encourage the average 12 year old to be riding at night, and that's the point of this.

Going on, "Riding at night is always more dangerous than daytime riding. If you must ride at night, avoid heavy traffic and dark, narrow roadways were posted speed limit is over 35 miles per hour. Vision is quite limited at dusk and night, so be very careful to avoid any road hazards. Make sure your bicycle is equipped with properly positioned reflectors.

The purchase and installation of an adequate headlight and taillight is required for nighttime riding. Small battery-powered lights that are designed to strap to your legs are also recommended." And it goes on and on.

MR. MEDFORD: Okay. Great.

MR. KERSHOW: We appreciate the complexity of the issue, and please don't be misled by our attempts to concisely provide warnings about the risks of night riding into thinking that we take a very simplistic view of the subject.

MR. MEDFORD: Good. Yes, Mr. Choi?

MR. CHOI: I'm not sure, I mean, why we're necessarily talking about it. I mean, saying, "Don't ride at night," is almost just a legal maneuvering by manufacturers in order to avoid that problem. We're not here to actually discourage riding at night. I mean, I hope that's not what we're here for. We know that riding at night does exist by children, and we're here to try to figure out a better way to save lives to make it safer.

MR. MEDFORD: Well, I think the commission staff really believe that children shouldn't ride at night. It's our position clearly, and it's our recommendation to the public that children not ride at night. And I don't think it's our position that we're going to encourage people to ride at night.

I think the reality is that some people do ride at night, and if they do, there must be some kind of information that you would give them about what their best chances are of being seen and not being involved in an accident if that happens. And that's what this discussion has been, in part, about.

MR. CHOI: As they're selling the lights in Europe, and it's kind of curious to see what kind of attitudes the children have in riding at night. And it's quite different

than it is over here. Part of it is that it's a real form of transportation. We realize that.

But for some reason, even when they're very young, when I see the kids go out riding at night, which they do in their busy streets, very narrow and everything else, they tend to grab a light. And it's become habit-forming for them. And I noticed that it's not something that they fear to do.

Somehow we're going to have to try to educate our young in a way to start -- I don't know. I don't have an answer for it -- a grassroots effort in trying to educate them to use that product and also to teach our parents to do so.

MR. MEDFORD: Okay. Mr. Blomberg.

MR. BLOMBERG: I think we have a hierarchy of objectives here that are getting somewhat confused.

MR. MEDFORD: Yeah. Right.

MR. BLOMBERG: On the one hand, I think we have a consensus that nighttime bicycle riding is more risky than daytime bicycle riding. That's a given.

MR. MEDFORD: Yes.

MR. BLOMBERG: The question is whether society is willing to accept that additional risk. And we're also discussing the fact that the riders who do ride at night usually do not minimize the risk that is inherent in that --

(End tape 3, side 2.)

MR. BLOMBERG: -- do it. That is not the objective I'm hearing from other people, and all of them are good objectives in terms of let's encourage nighttime riding because it solves a certain number of social ills. It establishes other benefits.

And I think we have to converge on a single objective before you can determine what the countermeasure is.

MR. MEDFORD: Well, we may not be able to get agreement on whether or not people should be encouraged to ride at night. I think we probably won't agree to that. But I think we would all agree that if people do ride at night there needs to be some form of information given to them, and we should do the best job we can about making sure that all the safety safeguards that can be taken are taken.

MR. BLOMBERG: But in terms of focusing the attention --

MR. MEDFORD: Yes.

MR. BLOMBERG: -- at this point, I think we have to converge on at least a single objective for making recommendations.

MR. MEDFORD: Yes. I agree with you.

MR. BLOMBERG: Because otherwise, we're all over the sky.

MR. MEDFORD: Yeah. I think it should be clear that I don't believe the commission staff is, as a result of hearing this discussion, is going to change its position about its recommendation about children riding bicycles. I clearly think we're going to continue to recommend against that. I think it's the prudent thing to do, and I think we know already that most children, a vast majority of kids, don't.

Yes, sir, in the corner.

MR. FORESTER: I had some involvement, you may recall, with the Darby case, and things are a little different, I think. I don't know what was said on television last night, but the following facts came out. One, the cyclist involved thought -- thank you. Yes.

Darby case. The cyclist involved thought that he was riding safely because he was misled by the front reflector. He thought that substituted for a headlamp.

Two, the Darby manual, while it said, "Use a headlamp," it put it on the page for off-road riding. Three, I have already stated that this young man's opinion was typical of people in his area, which are probably reflective of a lot of people in the United States as far as I can tell.

In other words, the all-reflector system makes them think it's safe. And furthermore, Darby thought that the all-reflector system was safe, that's why they wrote their manual the way they did, and they didn't know -- this is what they said in court, or in court papers -- they didn't know that the state laws required headlamps.

This terrible tangle has been partly caused by the presence of the CPSC regulation. It's been around for 20 years and never had any scientific justification. I can understand them wanting to protect themselves, but they're shooting themselves in the foot by saying, "We don't want people to ride at night, but we want to provide the all-reflector system to make them think they can."

That's not what they want to say, but that's what they are saying. We must not

tempt people into danger. Either equip yourselves properly, and have the proper training, or don't do it. That means no all-reflector system and easy ways to put on reasonably available varieties of proper equipment, headlamp and rear reflector that works.

MR. MEDFORD: You think the population in general probably have used the reflectors as a system by which they probably don't need to use lights?

MR. FORESTER: I've heard that in public meetings for 20 years.

MR. MEDFORD: Yes.

MR. FORESTER: However, the study I'm referring to is the first, shall we, statistical survey which has demonstrated that.

MR. MEDFORD: Okay. Yes.

MS. MCMILLEN: I think we've all gotten very caught up in what we should do and what we shouldn't do about the position of nighttime riding. I don't think it's going to go away. Nighttime riding is always going to be here. I think we need to focus on what is it that we can do to make it as safe as possible.

I don't think there should be any discussion as to whether we should be riding at night or should not be riding at night. That's not going to change anything. What's going to change something is if we come up with the safest ways for people who do choose to ride at night.

MR. MEDFORD: Yeah. I agree with that. Yes, in the corner?

MR. SCHUBERT: This is John Schubert from Pennsylvania. I think in many ways we've made the questions here unnecessarily complicated. We've talked about lighting standards and watts and candela and everything. We've got people who look like a black cat in an inkwell. If they've got 10 candela or 100 candela, they're in a whole new space.

So we have a behavioral problem before us. The technical problems we've talked about are really a sideshow and a very insignificant sideshow at that.

The very capable light manufacturers such as Mr. Choi here have seen to it that we don't have a technical problem for the quality of the lights. Even a garden variety battery-operated light with an old-fashioned incandescent bulb is reasonably good these days from the standpoint of conspicuity.

For that I suggest a notion which I'm not sure other people will agree with. I don't think the CPSC needs a headlight standard because the marketplace is moving far faster than the government ever will.

Here's what we do need. I have mixed feelings about the all-reflector system. I've been listening to John Forester's comments on it for about two decades, and I have great sympathy with John's point of view. I find myself sometimes in agreement, sometimes not.

I am also in great sympathy with the point of view that says, "Hey. Well, last night I was driving, and I almost hit this kid, and then I saw his reflectors." And the kid was essentially behaving passively. He didn't take them off, but he wouldn't have put anything on.

And I think we've all, driving our cars, seen bike riders we probably wouldn't have seen otherwise. So I would like to point out there is no perfect answer that the all-reflector system is a combination of good and bad. But if we keep it, I'm going to ask the CPSC to require the bike manufacturers to label it for what it is, and it is a second class system.

I propose the following wording. "CPSC warning: The reflectors on this bike are not adequate for safe nighttime riding. They are only a stop-gap measure for careless riders. State laws all require lights at night. If you want to ride at night safely, get a headlamp and taillight. Your bicycle dealer will help you select the lights best suited for your use."

If the CPSC does something like that, then you have the all-reflector system which provides the somewhat controversial benefits I mentioned earlier, but you're stating in no uncertain terms, at least for those people buying new bicycles, the shortcomings of the all-reflector system.

I have an ulterior motive for suggesting that. One of the things I've run into is the bike manufacturers have talked about warnings, and I've written manuals and warnings for a number of bike manufacturers in my consulting business. The one thing a bike manufacturer is generally unwilling to do in writing is to criticize a "safety" standard that manufacturer is required to conform with.

The CPSC knows this standard has inadequacies, but it will not be criticized in

print unless you take the lead, CPSC, because the manufacturers don't want to say that sort of thing. And I know in my conversations with my clients they're very reluctant to even ponder the possibility of putting that kind of warning in print. It runs counter to their grain. Their grain is much more conservative than that.

A PARTICIPANT: We have heard a lot about the requirements of lights in other countries, and I know from visiting -- my relatives live in Germany. I want to disabuse the notion that there is anything comparable there for several reasons, one of which is that they use bicycles so completely differently from the way we use.

It's almost misleading that the product has the same name because there it's used almost like a scooter to go one or two kilometers at a time. And also, Germany is a very different society. Compared to the U.S., Germany is not a free society. That doesn't mean that we want the freedom to kill ourselves at night, but it does mean that the way we buy products is different. The way we use them is different.

I've heard Darby versus Johnson mentioned several times. I just want to bring out that both the New Jersey legal press and the bicycle industry trade press have correctly pointed out the real lesson behind that lawsuit. The real lesson behind that is the defense lawyers blew it big time.

And the trembling that the bike industry has experienced from that lawsuit really should be viewed for what it is, lawyers doing a bad job. And the practical advice that people want to draw from that lawsuit is generally wrong because they missed the point that it was primarily the attorneys mistakes that led to that verdict.

Finally, we've talked about PSAs, and I just want to mention that I think the way to get a PSA is to drag out Dan Ackroyd from wherever he is. He once did a skit on Saturday Night Live of dangerous Halloween costumes. He had one that was a black ghost suit, and he called it "Invisible Pedestrian." Let's get Dan Ackroyd and his "Invisible Pedestrian" to do our PSAs for us. That will do it for now. Thank you.

MR. MEDFORD: (Laughter) Thanks. I think we generally at CPSC view PSAs as having very limited benefits. You show them, and they may have a benefit for a short period of time, but we're talking about a long-term problem that requires long-term commitments, and I'm not sure that PSAs really fit that bill.

3M showed in their video -- more reflectors now. I was interested in the

reflectors that are on the wheels. Is that a paint that's on the tire? Can you give me some information about that?

MR. BUCKLEY: There's a couple of different ways for applying reflective material onto a wheel. In Europe they do use tire sheeting on some wheels where it's actually applied right to the tire, and another application is using reflective tubing that is then put inside the wheel as an after-market type of product.

MR. MEDFORD: I see. I see.

MR. BUCKLEY: And here's an example of tire sheeting as to how it's done.

MR. MEDFORD: Does anyone require that today? Do any countries require that?

MR. BUCKLEY: The circle of light concept is required in Italy. It's also required in the Netherlands.

MR. BACON: Let me --

MR. BUCKLEY: Go ahead.

MR. BACON: Yeah. The information that we tried to present was on a country to country basis, and the Netherlands is the only unique country in the world that actually has a system that is different than anybody else. They absolutely do not allow spoke reflectors.

The Royal Dutch Association of Bicyclists used to be just a group of bicyclists, but for years there were many more of those than there were cars. And now they actually input to the traffic department laws, and the video you saw was actually input for the legislation that took place on January 1st of '87.

They looked at the effect of having the circle requirements in addition to front and back lighting. They looked at it after two years and found a definite reduction, and that was based on 9,000 accidents they went back and studied.

Dimestad (phonetic) University, the lighting university, they looked at different systems. And to actually define what needs to be on a bicycle, you have to take different systems. You have to get them out there riding. You have to get different age drivers. You have to approach them at different speeds. You have to have some sort of way to monitor that recognition.

Now that's what these studies did. They did it in a country that had a different

system. We found out what happened based on the drivers, the impact and the after-effect.

In Germany they did it as a test study before the effect, trying to see how people would react. And the circles was the most differential effective change in people's reaction time, but you don't throw away the other things.

But I've heard pros and cons about lights and maintenance and things like that. Typically, in the signing industry and different things, when you're approaching at a certain speed, when do you see it? How soon do you see it? So how bright and how obvious things need to be, those things have determined with actual drivers in night demos to really define what is the correct light because I would hate to see a bicycle manufacturer have to put something on if there's the impression it doesn't work. I would hate to see a reflector on there that doesn't work if the rider has the impression that it's going to keep him safe.

But the more you can define the person and the bicycle, we believe you're going to have accident reductions because that's a unique individual or circumstance on the road that differentiates it from vehicle traffic. The Dutch law is not a tire law. It's a circle law.

In Germany the circles are allowed as an alternative to the plastic reflectors on the spokes, as it is in Belgium. And in Italy, they actually have promulgated it, which means you can have this on in place of the spoke reflectors. But the original wording in the Italian traffic code essentially said you had to have a reflector on the spoke. Well, by definition, some of the products, being the tire, or this, was not a reflector on the spoke.

So these are totally different systems and systems approaches of identifying the bicycle, and we believe the evidence is there that it's working. It's definitely working in the Netherlands because they're unique throughout the world.

We see Germany in the report that came out in '91. I believe there's going to be some changes. This information gets input to the EEC (phonetic), and there is, on the table a draft there for bicycle reflection laws which will include circles. Some of the problems we see in the countries because of costs and things that the plastic reflectors are still allowed, yet there is no evidence that the spoke reflectors are

effectively doing what they're proposed to do.

MR. MEDFORD: Okay. I think Mr. Forester had a comment.

MR. FORESTER: I would suggest first that this question was gone over 20 years ago very thoroughly, and the idea was scrapped as a mandatory requirement. But notice, wheel reflectors are side reflectors. As the original BMA/Six requirement had them, you stuck them on the frame because they didn't have the other kind.

Then somebody came along and thought about tire sidewall reflectors. Somebody else came along and thought about spoke-mounted reflectors. But they're all side-facing reflectors. Of course, one of the reasons we scrapped the idea 20 years ago is that there are some kinds of tires you can't put these things on.

But, as I've said, side reflectors, no matter what shape or kind or anything else about them, they do not work because they are not in the headlamp beams at the time the motorist has to take action.

You see them. They are very popular. People say, "Oh, I saw that cycle. I saw those little dancing pieces going across the road." Point is, the only motorists who see them are those who are never in a position to hit the cyclist.

MR. MEDFORD: Okay. I think Larry wants to respond to that.

MR. BUCKLEY: I think in establishment of any countermeasure you take into account the bicycle and the person. We don't just take them to count the bicycle. There's a person on top. There's a profile a driver will see when they're following behind or approaching a bicycle. And granted that the profile is not large, you've got a person who's wearing a helmet, who's got a certain body shape.

The more it can be done to make the person visible, whether you use lights, whether you use reflectors, whatever you do, will improve the situation. It's an awareness issue. It's trying to make the driver aware of the person.

MR. FORESTER: That works from the back but not from the side.

MR. BUCKLEY: It's a combination of both areas. You want reflectivity or visibility from all angles of approach, whether it's the side, the back, the front. It doesn't matter which side people are looking at. It has to be from all levels.

MR. FORESTER: No, because the only time when the cyclist is in the motorist's headlamp beams is when he's ahead of the motorist. It's not true when he's

approaching at an intersection. It's not true when the motorist is making a left turn.

The only time that the motorist's headlamp beams shine on the cyclist early enough and long enough for the motorist to do something about it is from the rear. That's why we recommend doing the best you can to provide very good reflectors at the rear, which means SAE-type, in other words, not the wide angle type, an amber, and at least as big as you have now, and if people want them bigger, that's fine.

Those will work. But they will not work from the side or from the front because the motorist's headlamp beams don't shine on the cyclist.

MR. HERZ: Isn't this question something where there ought to be data to give us an answer?

MR. FORESTER: Sure.

MR. MEDFORD: Sure.

MR. FORESTER: You go up to any intersection and try it. You only have to do it once at night.

MR. MEDFORD: Well, it depends on the angle.

MR. HERZ: I'm really thinking in terms of documentation of accidents for X period in one location.

MR. MEDFORD: Right. Right. Randy, you wanted to ask a questions?

MR. SWART: I would just like to say that John is talking about square intersections. There are lots of intersections that aren't square, and there are a lot of people who ride on roads that don't meet at square angles. You can see those side reflectors on a bicycle that is not straight ahead of you sometimes, but not always.

MR. MEDFORD: Right.

MR. SWART: I would also like to say that I've used reflective tires, and I've painted 3M's glass bead tape on the side of tires and that sort of thing for years. I think that their concept is good. The round wheel is certainly an identifier, but one of the problems I found was that in practice it got dirty very quickly, and that cut down on the reflectivity considerably, so there is a maintenance issue there.

MR. MEDFORD: Mm-hmm. Good. Okay. Yes? A comment down there?

A PARTICIPANT: The headlights of the person who's approaching the bicycle are not the only headlights which might be shining out. Granted, again, that

sometimes you'll have a case where that's when an accident happens. But still, in traffic you've got lots of light sources flashing, and that many times is the driver seeing the bicycle in the lights of another car, not my own.

So I think there is a situation that Mr. Forester is addressing which exists and for which the reflectors are no good. There are other situations for which reflectors have a function, and the best of it is in those things that have been discussed suggests to me that there is a value in them.

MR. MEDFORD: Yes.

MR. FORESTER: Why go out and play Russian roulette? If it won't work for a considerable portion of the time, why have the system that won't when there is one that will work all the time?

A PARTICIPANT: Why load all the chambers?

MR. FORESTER: Exactly.

MR. MEDFORD: Ken, I think you had a comment.

MR. SEGERBERG: Ken Segerberg, National Bicycle Dealers Association. Just an observation. I don't think these tires are any better or any worse that the reflectors, so I'm a little bit confused as why we're hung up on this now because we're not moving forward with this discussion.

MR. MEDFORD: No. I know. I understand. I was interested in the technology and where it's being used around the world as sort of another aspect of information. Let's see. Was there another comment? Martin?

MR. GUTTENPLAN: I had a couple of things to throw out on the table. One is I worked in bike shops at the time when these reflectors came into use, and at that time, most of the mechanics, myself included, unless someone wanted the reflectors, would toss those into a box.

And I've been polling shops recently before this meeting to get a sense of -- and there are reasons for throwing them in the box, and I'll go into those in a second. And basically, bikes that are roughly under $400 are getting the reflectors, and anything over that, they're not -- the reflectors are not going on the bikes. And the bike shops are sticking their necks out to do that.

The mechanics don't believe in them, and in many cases, they interfere with a

lot of the componentry (phonetic) of the bikes. It adds time onto truing (phonetic) wheels. The spoke reflectors get in the way of the spoke wrench.

And one of the things that I've noticed over the years is that there seems to be a basic reflector kit that gets thrown in with most of the bikes, and the brackets don't really put the reflectors in the proper place on the bikes. This is not in every case.

I've noticed some of the manufacturers are doing better on this, but if we're going to continue a reflector system, I think it's important that it not be just a simple add-on that comes, you know, straight out of Taiwan and goes on every bike and, you know, with cryptic instructions on how to use them.

I think the bicycle manufacturer needs to be incorporating the reflector placement in their design process so that you have a reflector -- for instance, if you have a reflector on the rear, you have it above the rear wheel.

In many cases, you have a rear wheel that rises above the bridge where the brake goes, and the bracket lifts up about an inch and a half, and then there's a reflector that is completely hidden by the rear wheel from behind, and this is in so-called compliance.

MR. MEDFORD: That's interesting.

MR. GUTTENPLAN: And the front reflector is usually -- if you go see them in any store or shop, they're facing down to the ground. They're not facing straight out.

Anyway, there are creative solutions out there if it's incorporated into the design process of the bike. Another thing to toss out -- I'm not a bike manufacturer. I don't know the cost of it. What would the cost be of putting retro-reflective paint on either all or part of the bike?.

And lastly, another thing to consider maybe piloting in one area of the country or one city, one state, is a night riding bicycle license. To get this license, you would come into the driver's license bureau. You would take a test of maybe five or six questions, doesn't need to be extensive, and you would get a license and a retro-reflective sticker to put on your bike that indicates that you have achieved that license.

And basically, you know, you'll learn the basics, that, you know, you're invisible at night. You need a light if you're going to be seen and that sort of thing.

Anyway, I don't throw these out as fully finished ideas but for everyone to think about and maybe add on to.

MR. MEDFORD: Okay. Mike.

MR. ROOD: Yeah. I'm Mike Rood with Sate-Lite Manufacturing. We think about reflectors all the time because that's our business, so we have to give it some thought.

If you read the current CPSC requirements, you'll know that there are specific mandated outlines on where and how to mount, how much force it takes to bend it, how it can't touch the ground if you lay the bike down, how specifically to mount it on a bike. Bicycle manufacturers have to follow these guidelines exactly to be in compliance because we understand how important reflectors are.

I have never really had to defend reflectors as a product before. They seem to make so much sense to everyone. If you consider the fact that statements have been made that side reflectors only protect the bicyclist if the motorist is stopped, that's not true. Lights can hit and do hit moving bicycles by moving vehicles depending upon the angles.

There is a safety involved in passive requirements for reflectors. We believe they're an important part of the bicycle safety requirements. We're not against light usage. We suggest it. If you're going to ride at night, we believe you need to, but we know there's a certain segment of the population who won't use or maintain lights.

Reflectors, as a product, don't seem to be a bad idea. I don't understand Mr. Forester's comments about side reflectors, and I suggest we study it further.

MR. MEDFORD: Mr. Forester?

MR. FORESTER: As he says, he doesn't know. I think most of the people here do. But here is the situation. A motorist is going west. The cyclist is going north. The motorist has a duty to yield to the cyclist. His headlamps are shining west. The cyclist is to the south of him. How is he going to see the reflectors when his headlamps don't shine there? Of course, he can't.

So what does he see? He sees about half a second worth. In half a second you can't stop that car.

MR. ROOD: Do you agree that there are instances when you can, however,

with certain meeting instances, use side reflectors on a bicycle? Obviously, a light is better for a westbound car to see a northbound bicycle. But side reflectors are helpful. They do work. We talk about a bicycle having a signature.

MR. FORESTER: Look.

MR. ROOD: Just a moment. You've seen at night a bicycle riding away from you, yellow pedal reflectors going up and down, and a red reflector. And possibly even you've seen the white -- normally in the U.S. -- white side reflectors. You see them. They have a signature. They make sense. We're not against lighting. We feel that would have added conspicuity.

MR. FORESTER: Look. Describe to me the situation in which the motorist will see the side reflectors of a bicycle in time to take preventive action, and furthermore, demonstrate that's a large number of the instances in which we're out at night. There's no point -- as I said before -- no point in going out with a system that makes you safe half the time if it's dangerous the other half.

MR. ROOD: And I will, please. We know that lighting is --

MS. BROWN: I don't think we want to have a debate here going on. I thought there was a gentleman down here --

A PARTICIPANT: This type of accident is by far the smallest percentage of accidents. Rear end, front end are a much greater problem, and that's what we're here to talk about.

MR. MEDFORD: Right. It is. And I think we're almost to the point where we need to wrap up. Randy, do you want to make one point?

MR. SWART: Yeah. I have another issue. As I mentioned earlier, helmets are my thing, and I would like to, if you don't mind, ask Scott Heh, who is doing the CPSC's bicycle helmet standard, if he could just summarize the comments he's gotten so far on conspicuity with regard to the standard and what CPSC staff is thinking about whether or not we could require that helmets be conspicuous either daytime or night.

MR. MEDFORD: Scott.

MR. HEH: I'm Scott Heh, and I'm the engineer who's working on the bike helmet standard. We have just about all the comments in on this standard. There are

almost 30 of them, and at least five or six I say recommend very strongly on the CPSC requiring bicycle helmets to be conspicuous both at daytime and nighttime.

And that's something that came very new to us, and we are looking at that very strongly. At this point we're in the very early stages of looking at that, but it's something we're going to consider.

MR. MEDFORD: Good. Kirby and then we're going to have to wrap up. Kirby then Brock.

MR. BECK: I promise I'm not going to talk about side reflectors, but I'm going to talk about front and back real quick.

The way I understand the current CPSC reflector requirements, especially from the back, it's required to cover a wider angle. To do that it usually has three smaller side, and so either one of those three sides really isn't very big. And I think most of us agree here that a larger surface area is more effective. And I think considering the illumination of that three-sided standard is important.

MR. MEDFORD: Okay.

MR. BECK: My other concern is the front reflector. I think the front reflector sends a bad message. I know LAB's recommendation was to put, like some kind of a warning label on, "This is not the place for a headlight."

I think taking it off is probably real important, too. I know people can say, "Well, what's it hurt?" What it hurts is it sends the message you don't need a headlight. I went through this study from 1990 where they reviewed all the state laws.

There is only one state in the country, that being Montana, that even requires the front reflector. Right now the only requirement would be the CPSC standard. I don't think it sends a good message to have it there.

MR. MEDFORD: Okay. Well, we've gotten a great deal of information. Brock, do you want to say something?

MR. LANDRY: Just quickly, I'm Brock Landry. I'm here representing the Bicycle Wholesale Distributors Association. They sell their products basically through independent bicycle shops.

Ron, you asked for some specific recommendations of what might be done. I think one thing that could be done by the commission in cooperation with BWDA and

the LAB and the others around this table is to endorse some of the safety materials that are now being developed to get these warnings out to consumers so that there's a set of materials that is fairly uniform and has some imprimatur of the CPSC behind it alerting consumers to some of these possible situations they're going to run into using lights if they choose to ride at night, things of that nature. I think that would be very helpful.

MR. MEDFORD: Right. And I know you have something pending before the staff now where we're looking at that. I'll just give you brief information on that. The commission at any point will consider materials that are being produced for public distribution in which companies would like to have CPSC's logo or co-sponsorship on them.

The way that generally works is you make a formal request to the commission. The staff reviews it to see that they are adequate in terms of the technical information provided, and then we make a recommendation to the commissioners. And it goes for a formal vote of the commission before anything is put on.

So I think that's a fine idea. Any of you that have materials like that you think would benefit from CPSC's logo and you believe meet the kinds of technical rigor that we would require, I encourage you to submit it.

Anything else? Let's wrap up a little bit. We've gotten a lot of information, and I really appreciate all of you travelling here today and the real attention that you've given. I think that we've gotten a lot of very specific information, and what the staff intends to do now is to go back and reflect on what you've said today.

A lot of information has come to us about the CPSC standard, in particular about the reflectivity issues. We're going to take those under consideration. We're going to have the staff look at those and see if there aren't some improvements that can be made based on the data that we've either gotten here or can get subsequently.

The BMA has made a very specific recommendation about the need for a lighting standard, and they're talking about a voluntary ANSI lighting standard which they would take the initiative on beginning the process. I would encourage them to do that.

I think that from what we've learned about lights today there's a whole

marketplace that's filled with a whole variety of lights, some of which meet some minimum requirements that may not really be adequate to meet the problem that we're trying to address here.

And then some of those lights actually go beyond what is needed and may even create some safety problems, at least that's been the suggestion that I've heard from some people today. So, I would encourage BMA to initiate that activity. I think it's worthwhile and probably appropriate.

There is another recommendation about bike light brackets. That one I don't know very much about, and I think the staff will look at that, and we need to have some further conversations with those people that made those recommendations about what seems to be appropriate.

There were a number of recommendations today about information-education efforts. Some people talked about public service announcements. Brock and others have talked about other print material. There's been some labeling information that's been suggested. All of those things, I think, need to be looked at.

Some people have suggested that CPSC consider a specific label with respect to lights or what the reflectivity requirements are really intended to provide that are in the standard now and what they're not intended to provide. We'll take a look at those things.

And that's what I have on my notes about the things that you have said. Are there any other specific requirements other than that anyone would like to bring up now? Yes, sir?

A PARTICIPANT: Just to make one comment. You were talking about lights. And a second comment on this that there are no standards, and there's a possibility that there are lighting systems out there that are so powerful that they maybe dangerous. Keep in mind that about 85 percent of the bikes sold today are mountain bikes. Those are for off-road riding.

MR. MEDFORD: Good point.

A PARTICIPANT: And those systems have to be super high-powered and maybe aren't intended for road riding. But just keep in mind that.

MR. MEDFORD: Very good point. Thank you.

A PARTICIPANT: Helmets.

MR. MEDFORD: Helmets. Goes without saying that we're already underway and doing the analysis, the comments on the helmet standard and what reflectivity or requirements are going to be put on there or are under active consideration.

I would like to turn now the microphone over to the chairman.

MS. BROWN: Was there a further comment?

MR. MEDFORD: Further comment?

A PARTICIPANT: Yes. I would just like to say once that when you consider -- if it's on.

MR. MEDFORD: It's on.

A PARTICIPANT: Okay. When you consider a standard bracket for mounting lights, please consider some of the quick-release brackets that are available today because the one that I use hooks right to the handlebar, and I can take it from one bicycle to the next. I ride many different bikes, and there are over a dozen of them in our home. And we're not going to buy a dozen lighting systems that would meet some standard.

We want to protect the individual, and we put a light on the bike before we ride. When you speak of a standard mounting, at least consider some of the quick-attach ones that are available today. Thank you.

MR. MEDFORD: Thank you.

MS. BROWN: Well, I want to thank all of you for being here. It looks like it was heated, interesting. It looks like we have hit upon some topics that need some work, and we think this is very valuable to bring all of you in.

Don't think that you've heard the last from us. We're not going to just get this information and let you off the hook. We think it's very important that in anything that we might do that we bring all of the interested parties in so that we can do the very best for the American public that we possibly can.

Thank you for letting me just come back and hear a little bit of the end, and anything further that you have to add, you can add in written comments, of course -- any kind of comments to Ron or to Greg that you need.

And I look forward to hearing from all of you and talking to you again and to

moving forward on this all important item, something that can enhance safety and enhance fun at the same time. So thanks very much for being here.