05

LOG OF MEETING
DIRECTORATE FOR LABORATORY SCIENCES

2/15/1995

SUBJECT: Visit by David Thom

DATE OF MEETING: January 27, 1995 **PLACE:** CPSC Engineering Lab, Gaithersburg, Md.

LOG ENTRY SOURCE: Frank Vitaliti FJV

DATE OF ENTRY: February 15, 1995

COMMISSION ATTENDEES: Frank Vitaliti, Larry Moskowitz, and Nelson Caballero (LSEL), and Scott Heh (ESME).

NON-COMMISSION ATTENDEES: David Thom, Director, Head Protection Research Laboratory, University of Southern California

SUMMARY OF MEETING

David Thom visited LSEL's Bicycle Helmet Test Facility, and from his observations and our discussions, LSEL staff attendees summarize the following issues:

- David uses 10-32 bolts for the roller bearings, and maintains approximately the same tightness as LSEL's current adjustment.

- the ball clamp (attaches the headform to the ball arm) may loosen over time. To prevent this, David has a metal plate welded (or could bolt-on instead) for reinforcement, to prevent the neck down area of the ball clamp from cracking and creating a loose fit. See Figure 1.

- it is necessary to have a clearance of approximately 0.010 inch between the ball clamp and the headform mating surfaces. This assures more uniform tightness. (The same is true of the mating surfaces of the spherical impactor).

- Frank suggested a more practical calibrator design, by redesigning the impactor into the shape of a hemisphere (instead of the current sphere), and use the existing headform ballclamp to attach the redesigned hemispherical impactor. This alternate design would still provide the uniform spherical mating shape onto the pad, and would not necessitate removing the ball clamp by dismantling and separating the ball arm from the carriage. This would also alleviate the problem of removing the press fit roll pins often.

- USC uses a different accelerometer: Endevco Model No. 7710 with single conductor cable and "coax" type connector (LSEL uses an Endevco Model No. 7231C-750 with a six conductor cable and solder type connections), plus a

signal conditioner/data acquisition equipment recommended by Endevco.

- USC uses the Endevco supplied accelerometer stud, which is threaded into a larger bolt (5/16 O. D. with 10-32 tapped female threads), using lubricant only on the threads, not on the mating surfaces. David also recommended cleaning the mounting surface of the accelerometer with a q-tip. See Figure 2.

- David recommended periodically filing the mating surfaces of the MEP pad and the 3/4 inch steel plate to remove any burrs.

- LSEL's 3/4 inch steel plate measures approximately 20 inches by 21 1/2 inches, which barely complies with the current 3 square foot area requirement defined in the proposed standard. Keep the minimum surface area requirement in mind when considering making a raised concrete block platform.

- One of two roll pins (located between the carriage neck and the neck shaft) was observed having a loose fit, caused by repeated dismantling and assembling. Both pins need to be replaced with new larger roll pins. David recommends tapping the neck shaft, placing a curved washer on each end of the carriage pin hole, then threading a bolt through the carriage and into the neck shaft, and using a nut on the protruding end of the bolt. He also uses foil shim stock between the neck shaft mating surfaces. See Figure 3.

- USC felt that differences between the "twin wire" and the monorail impact rigs may need to be addressed in the standard.

- USC uses two bolts on their velocity flag, to prevent bending during impact.

- Source for drop rig rail: Linear Industries, Enterprise, Wyoming 1-800-821-2875

- L. Moskowitz and D. Thom discussed the possible effect of low frequency headform resonance passing through the filter and distorting the impact waveform.

- D. Thom discussed the DOT motorcycle helmet standard. His opinion is that while some disagree on the appropriateness of the DOT time duration impact requirements, the net effect is a good helmet. This is due to the low "peak g" characteristic that helmets that comply, have in order to meet the time duration criteria at the 200 g level.

cc: Nelson Caballero, LSEL
George Sushinsky, LSEL
Andrew Ulsamer, LSEL
Scott Heh, ESME
OS (2)

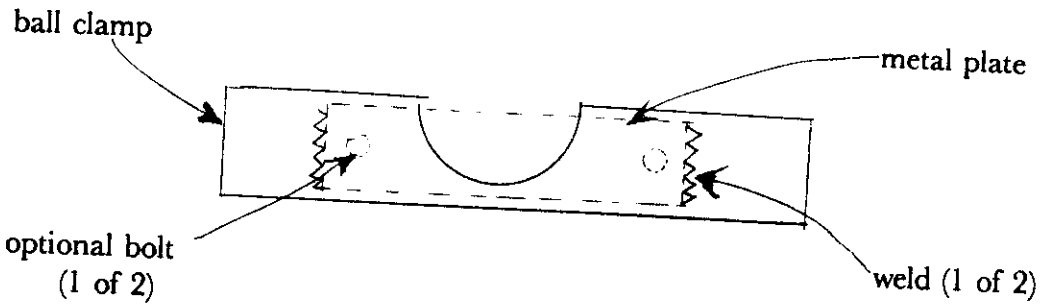

Figure 1

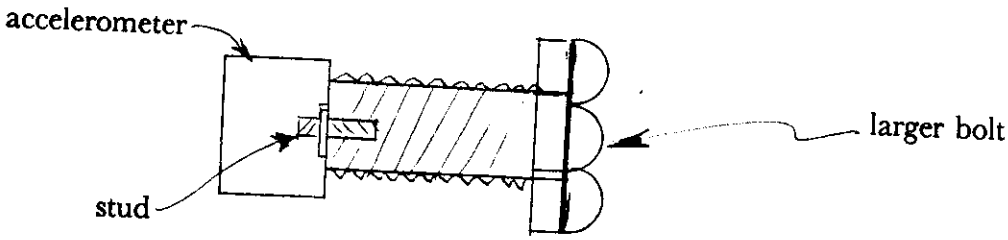

Figure 2

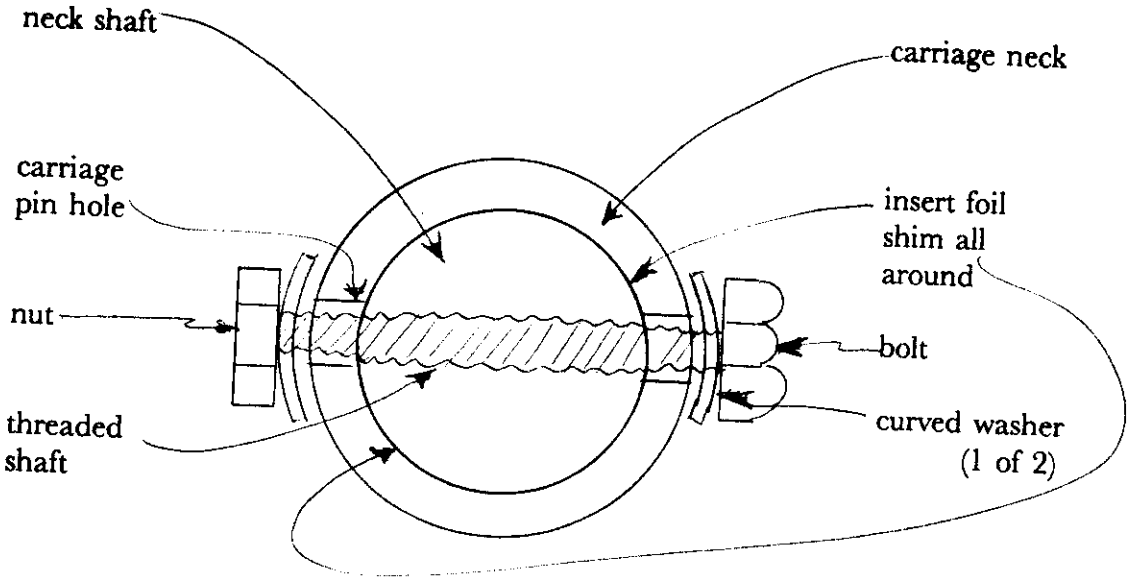

Figure 3