

3. RESPONSES BY F. Y. YOKEL TO MISCELLANEOUS WORKSHOP CORRESPONDENCE

The letters in this section were written in response to some of the written comments submitted in the workshops. Many more comments were made, such as written comments submitted by AFL-CIO; however, there was no follow-up correspondence. Many of the comments are discussed in the workshop summaries in Section 2.



July 16, 1961

Mr. John B. Cook
Efficiency Production, Inc.
P.O. Box 24126
Lansing, Michigan 48909

Mr. Wendell Wood
Griswold Machine & Engineering
Highway M-60
Union City, Michigan 49094

Gentlemen:

First I want to express my regret that we did not communicate sooner. Had you been involved in the preparation of the Workshop input draft, we would probably be much closer now to a meeting of the minds.

Before going into details, I would like to make some general comments:

1. The "Standard Practice" is proposed because we came to the conclusion that it is in many cases not practical to have an engineer design the shoring in a trenching situation. This reflects the real-life situation, and ASFE is in full agreement with this conclusion. The "Standard Practice" in no way precludes that decisions on shoring be made by an engineer. If an engineer does make the decisions, he does not have to follow the Standard Practice [1926.652(a)(2)].
2. The "adjusted depth" in the Standard Practice is designed to enable the foreman to allow for surcharge situations. While it is true that a spoil pile is higher than 2 ft., it is very unlikely to cause lateral loads greater than those caused by an evenly distributed surcharge of 2 ft. in the typical trenching situation. If we eliminate this adjustment, an engineer would have to be consulted in every instance. We do not believe that this is realistic.
3. The introduction of the concept of the short-term excavations again reflects a real-life situation. It is a fact that in actual construction practice in the U.S. and other countries, slopes are steeper and shoring systems are weaker than those that would be recommended in accordance with accepted engineering practice. However, there is no reason to reduce conventional safety margins for excavations which stay open for many months.
4. To come back to "accepted engineering practice": Coulomb and Rankine did their work a long time ago, at a time when actual measurements were not available. Appendix A reflects present engineering practice which is based on measurements which were made in the last 20 years, some of them as recently as 2 years ago. Now it is true that nobody made measurements for the trench box situation. I expressed my preliminary thoughts on this in the memorandum on the Dallas Workshop

(attached). I think you have a point when you draw a distinction between trench boxes and typical shoring. However, you made a good case for sands, but not for clays. Sands will develop the typical "active" pressure diagram when enough displacement is allowed. However, clays will creep, and when bearing against a retaining structure which is restrained about equally top and bottom (as distinct from a retaining wall which can rotate about its base) will exert some sort of parabolic pressure diagrams which is closer to the square than the triangular. Once we deviate from the simple lateral-load requirements of the proposed soil classification, one would have to make a case for the extreme in each category. This would be medium clay at the lower strength limit for Type B soils and soft clay in an excavation with a soft bottom for Type C soils. I am not really opposed to somehow permit an engineer to make the case for the full range of soils falling under Type B and Type C soils, as an alternative to using the proposed pressure diagrams. However, I suspect that if you do that your gain in material will be trivial (and perhaps you will lose).

If you believe that an engineering alternative to the standard pressure diagrams is desirable, I would urge you to propose a specific amendment to Section 1926.652(4)(ii).

Here are some specific comments on your submission:

1. I suggest that you date future submissions, since you may change your mind on some points and we must be sure we always reference the proper memorandum.
2. Page 8, item(s) - I do not object to this.
3. Page 9, item 2a - Who will determine which engineer is "qualified?"
4. Page 10, item (b)(1) - My own inclination is to make the dividing line 3 days. This will allow leaving trenches over a weekend without extra struts. You may choose not to distinguish between long- and short-term for trench boxes.
5. Page 10, item (4)(i) - An engineer, if he gets involved, would probably not use the tables.
6. Page 11 - 30 lb./ft.³ for Type B soil would be in my opinion grossly inadequate for medium clays. Even 40 lb./ft.³ is on the low side.
7. Page 13, item (ii)a - If an engineer wants to make a case that a trench box is adequate for a certain depth and soil type he could go to the state-of-the-art and use the appropriate pressure diagram. Otherwise your proposed modification could produce inadequate design. I would welcome any specific suggestions for simplifications in Table 1. We have been trying to do that for a long time.
8. Page 13 (ii)c - See Dallas memorandum.
9. Page 13 (iii) paragraph 2 - I doubt that a foreman in the field could use engineering practice to select shoring.

10. Page 13 (iii)a - Would you make a surcharge allowance in your advanced rating? Otherwise surcharge is likely to be ignored altogether.
11. Page 16, item 4 (iii)(4) - You are probably right.
12. Page 16, item 5 (iii) - There seems to be a consensus on your suggestion. However it has been suggested that item (a) may be too vague as we wrote it.

Definitions:

13. 18 a - I agree with you.
14. 18 c - See previous comments.
15. 19 m - See previous comments.
16. 19 o - Your definition is a step in the right direction, but may still be too vague.
17. 19 t - See previous comments.
18. 19 z - I agree.
19. 22 - 2.1 - If we eliminate B(c) there would be the question what is accepted engineering practice for, say, the oil pressure in hydraulic systems? However, certainly I have no problem with following engineering practices to the extent that they are defined.
20. 22 - 2.1 A and B - This should be further discussed.
21. 22 - 2.23 - See previous comments.
22. 27 - 2.32 - How are we going to reasonably control the quality?
23. 30 - Appendix A is at best a guideline. It does, however, agree with present practice in excavation bracing (see reference listed).
24. 37 - 5(b) - Should be further discussed.
25. 38 - A.5.2 - Few practicing geotechnical engineers would agree - however a special case for the trench box, if thoroughly documented, could conceivably be appropriate. Perhaps Wayne Clough's (Stanford University) programs could be used to make a study. Unfortunately the NBS funding situation would not permit me to undertake such a study.

I appreciate very much your effort to contribute to an improvement in our draft standard. I would suggest that we try to have a dialogue with ASFE on some of your suggestions.

Sincerely,

Felix Y. Yokel, Leader
Geotechnical Engineering Group
Structures and Materials Division
Center for Building Technology, NEL

cc: Mr. Paul Bouley
Mr. John Maragliano
Mr. John Ramage
Mr. Ronald Stanevich
Mr. Bill Zoino



UNITED STATES DEPARTMENT OF COMMERCE
National Bureau of Standards
Washington, D.C. 20234

August 13, 1981

Mr. Gordon Helmeid
Director, Bureau of Technical Services
State of Wisconsin/Department of
Industry, Labor and Human Relations
201 E. Washington Avenue
P.O. Box 7969
Madison, Wisconsin 53707

Dear Mr. Helmeid:

I was gratified with your supportive comments on our proposed standard practice for excavations and I would like to discuss some of your specific comments.

1. You take exception to the suggestion in my Workshop memorandum that no changes should be permitted when a traditional practice is accepted on the basis of its track record. I think that my statement was somewhat vague and you therefore misread the intent. What I suggest to stay away from is taking some traditional scheme - say timber, and then substituting some of its members by other members of "equivalent" strength, say aluminum. There is much danger in this. A wood member may have a safety factor of 4 relative to its actual failure strength, while the aluminum member has only a safety factor of 1.6 or even less. There is also the problem that lateral loads on bracing members depend on their stiffness and method of installation. Consequently, I propose that if any substitution is made, the new member should comply with the standard practice. I certainly would be the last person to suggest that safety rules should not be upgraded. However, what I strongly suggest is that the standard practice be followed when the upgrading is implemented. This way we will eventually move toward uniform practices in the U.S. which will be beneficial for safety as well as economy of the work.

2. I am not sure what you refer to in the fourth paragraph of the second page of your letter. I thought you may be talking about comment 1, page 3 of the "Working Draft." This comment should read: Section 1926.651(o).

3. I take it that you recommend a 20 ft. depth limit. As you probably know this has been a point of controversy in the Workshops. Contrator's in most parts of the Country (except California) favor 24 ft., Unions favor 15 ft. You come down

in the middle. I think I could live with 24 ft. if we have some safeguards for soft soils.

4. Qualified Person - Please note that we have two definitions: a "competent person" is one who is competent to implement the standard practice in the field. A "qualified person" is one who can design shoring using engineering principles.

You may note that in our draft we refer to an "engineer" rather than a "qualified person." However, many contractors, particularly in the South (Dallas and Atlanta Workshops) favor the definition of "qualified person."

5. The reason for recommending deletion of Table P-2 is that we could not prove that the timber sizes are consistent with good engineering practice, and there was also no evidence (like in the case of the Wisconsin regulations) that the table is used in practice. We are not against providing tables for timber, hydraulic shores and possibly other systems in an appropriate Appendix. But I see no point in singling out one material for such a presentation.

6. The timber table in the Appendix of the Workshop paper was developed using the Standard Practice. Allowable timber stresses used were for Mixed Hardwood II which includes some weak wood species (see Page 29). Unfortunately, engineering calculations do not support the common field practice of using the same timber sizes for struts and wales. Note that the table goes to very wide horizontal spacing of struts and uses a 5 ft. vertical spacing (except for spot bracing). Generally, strut sizes come out to be consistent with traditional field practice. Wales sizes in our table are larger than those commonly used (in spite of the 20 percent load reduction we permit for wales). There is nothing to prevent a contractor or a region or State from developing their own timber tables, using the design loads and stresses stipulated in the Standard Practice.

7. The wood table was developed in our timber study, precisely for the reason that hardwood is not graded, and is based on an extensive field survey. It is quite possible that the hardwood timber supplied in Wisconsin qualifies for Mixed Hardwood I, or even Mixed Oak. The Forest Products Laboratory in Madison could probably make this determination. Note that we recommended in our timber report (BSS 122) that the Industry adopt grading for trenching timber. If this were accomplished, we could probably go to higher design stresses.

8. Soil Classification - Unfortunately there are many soil types, and any way you want to group them you have some problems. We felt that the most important "common denominator" for grouping soil is pressure exerted on shoring systems. We also came to the conclusion that it is impractical to have more than three soil types. Thus under Type C we have all soils which are likely to develop high lateral pressures. These include soft clays, which can stand on relatively steep slopes, but also very weak soils such as marine silts which cannot be sloped at all. Thus the slopes we stipulate are the "steepest allowable," but not necessarily the "steepest possible." I am trying to introduce the "stable slope" concept, which would put more responsibility on the contractor in choosing the slope, but it is opposed by AFL-CIO. Note that on Page 11, footnote 3, we say that soft soils include clays which can be easily penetrated several inches by the thumb and soils that cannot stand on a 3:1 slope (muck). This is a reference to two entirely different soil types. The soft clay will easily stand on a 1-1/2:1 slope. The muck probably cannot be sloped at all. Both, however, exert high lateral pressures on shoring. By the way, I had no problem correlating our soil classification with yours, and I believe that our classification could work well in Wisconsin.

9. Gravity Load on Struts - The 240 lb. load on struts was stipulated so that, in an emergency, the strut could support a man who is trying to climb on it. We found ample evidence that workers do step on struts, regardless of what we stipulate in our regulations. This is also the reason why AFL-CIO would want an even larger gravity-load resistance. I am quite aware that the 2 in. thick Wisconsin struts cannot support such a gravity load.

I do not know if this letter answers all your questions. I would very much welcome the opportunity of working with you in an attempt of reconciling your needs with the proposed Federal Standard. I am trying to get some further funding from OSHA or NIOSH so NBS can stay involved in this problem until everything is resolved and I hope that these agencies will recognize the importance of a successful "end run."

Sincerely,

Felix Y. Yokel, Ph.D., P.E.
Leader, Geotechnical Engineering Group
Structures and Materials Division
Center for Building Technology, NBS

Enclosures

August 12, 1981

Mr. A. Youhanaia
Bridge Engineer
Chicago, Milwaukee, St. Paul
and Pacific Railroad Company
516 West Jackson Boulevard
Chicago, Illinois 60606

Dear Mr. Youhanaia:

This is in response to your July 21, 1981 letter. I shall try to answer your questions.

(1) Surcharge:

Surcharge effects were derived by elastic theory based on the assumption that the surcharge load is applied after the bracing is in place. Since 1 ft. of additional depth in Type A soil will produce a lateral thrust of 20 psf, and 1 ft. of Type C soil will produce a thrust of 80 psf, the depth adjustment for Type A soil has to be greater. (See derivation on Page 44 of the enclosed report.)

(2) Effect of Adjacent Foundations:

The rule of thumb that is proposed to identify cases where adjacent foundations significantly affect the lateral forces on bracing is presently widely used and is generally conservative. However we recognize that there may be instances where it is not conservative enough.

You should keep in mind that the standard practice proposed in the article is intended to insure the safety of workmen. Other important aspects of excavation practice, such as settlement control of adjacent structures are not within the scope of OSHA jurisdiction.

Sincerely,

Felix Y. Yokel, Leader
Geotechnical Engineering Group
Structures and Materials Division
Center for Building Technology, NREL

Enclosure



**Chicago, Milwaukee, St. Paul
and Pacific Railroad Company**

516 West Jackson Boulevard
Chicago, Illinois 60606
Phone 312/648-3000

July 21, 1981

Geotechnical Engineering Group
Center For Building Technology
National Engineering Laboratory
National Bureau of Standards
Washington, D.C. 20234

Gentlemen:

This refers to the article "New Concepts For Construction Practice Standards For Excavations," by Messrs. Felix Y. Yokel and Riley M. Chung of the National Engineering Laboratory, National Bureau of Standards and Mr. Ronald L. Stanevich of the National Institute for Occupational Safety and Health, as printed in the April, 1981 issue of "Concrete Pipe News" of the American Concrete Pipe Association.

Specifically the reference is to the table for additional surcharge allowance for heavy equipment near supported excavations.

For a given trench depth and weight of equipment the additional surcharge depth is indicated as greatest for soil Type A and least for soil Type C.

In the soil type table Type A soil exerts the least equivalent weight effect and Type C soil exerts the greatest effect.

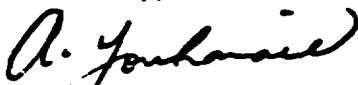
Type A soil is indicated as having greater cohesion while Type C soil possibly could have a coefficient of active earth pressure equal to or greater than Type A depending on their friction angles θ .

Can you explain the rationale in which Type A soil exerts greater force from heavy equipment and consequently requires greater additional surcharge than Type C soil?

The second question is in reference to the effects of nearby foundations on supports for excavations. Our interpretation of the data for this topic is that any foundation beyond the limits of a 1 to 1 slope line from bottom of excavation will not produce force on the excavation supports. Are we correct in this interpretation?

Any additional information you can supply would be greatly appreciated.

Yours truly,



A. YOUNANAIE
Bridge Engineer

RJW:jmb

4. MILWAUKEE, WISCONSIN, WORKSHOP - WRITTEN COMMENTS AND CORRESPONDENCE

This section contains all the written comments and correspondence associated with the Milwaukee, WI workshop.



State of Wisconsin \ Department of Industry, Labor and Human Relations

SAFETY & BUILDINGS DIVISION

201 E. Washington Avenue
P.O. Box 7960
Madison, Wisconsin 53707

July 9, 1981

Dr. Felix Y. Yokel
United States Dept. of Commerce
National Bureau of Standards
Bldg. 226, Room B-162
Washington, D.C. 20234

Dear Mr. Yokel:

The Trenching Code ad hoc Group of Wisconsin DILHR generally agrees with the spirit of the revisionary work being undertaken by you and your select committee on the basis that it inspires and provides for a necessary review of the Wisconsin trenching safety rules. The Wisconsin Trenching Code has historically provided the State with a good safety experience in this construction activity.

Comment to the effect that a good 'track record' is recognized and given consideration in the revision being contemplated is noted in your memorandum of June 23, 1981. That the State of Wisconsin, which has had a trenching code since 1/2/56 (revised 1/1/63), is singled out, is viewed as both complimentary and supportive of the past work done in trenching safety in the State of Wisconsin.

We should like to comment more directly on the items contained in your memo of June 23 and also provide suggestions and what we feel are constructive comments relating to the WORKING DRAFT¹.

Reference is made to Page 1 of your memo wherein you quote from a summary recommendation made in (BSS 127), Appendix A: Page 59, A.3, first paragraph:

Traditional timber shoring practice varies widely from location to location and frequently depends on such variables as sizes and characteristics of available timber, soil conditions, and local work practices. In some locations these practices have been used for many years and appear to be satisfactory to all the parties concerned. Three such locations are the State of Wisconsin. . .

In the same document, Page 65, second paragraph:

Since, in spite of the results of this analysis, NCS could find no evidence that conventional timber practice, if properly executed is unsafe, consideration could perhaps be given to temporarily exempting conventional timber shoring from the lateral load requirements until lateral load effects can be further studied by actual measurements in the field.

Mr. Felix Y. Yokel
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July 9, 1981

The foregoing commentary has an affirmative and positive air, and it is hoped that this attitude toward rules of long standing will not be changed by the obvious trenching rules. A statement made (Dr. Yokel memorandum, Page 2):

(b) The evidence on which we can base the permission to use a traditional practice which does not comply with our recommended provisions is its track record, rather than compliance with engineering principles. Thus, if it is allowed, no changes in it should be permitted. Such changes would include substitution of any of its members by other members of "equivalent" strength.

It can be stated here that the rules used in the State of Wisconsin were not developed in an arbitrary and capricious manner, but were developed consistent with engineering principles and practices in vogue at conception of the rule. The exceptional track record came about because of the rule, not in spite of the rule. Further, the statement no changes in it (rule, practice) should be permitted, tends to prevent upgrading a rule should it be desirable to do so in the interests of maintaining the good track record established. It would seem more reasonable to permit change of rule to upgrade the Code based on approval by some jurisdictional body. However, the precaution to permit only practices which are actually widely used and discard other parts which do not have a proven track record, is certainly acceptable.

In the WORKING DRAFT^{1/}, the proposed Subpart, (p), 1926.650 General Protection Requirements, which appears on Page 5, is generally acceptable to our ad hoc Group. However, in 1926.651 Specific Excavation Requirements, the Subpart I referred to you under 1926.651 appears to be omitted.

In the WORKING DRAFT^{1/} tables and charts are based on a depth of 20 feet maximum depth of excavation. It is understood that the question of depth consistent with "Standard Practice", has not been resolved at this writing. It is hereby suggested that a depth of 20 feet be established and charts be prepared to reflect this concept. The IND 6.^{2/} may be adjusted to reflect the 20 feet depth concept.

In Part 1926.653, WORKING DRAFT^{1/}, Definitions Applicable to this Subpart, (p), Page 19, a definition is provided for a Qualified Person. It is hereby suggested that the definition, as presented, covers persons in a supervisory capacity within the scope of Standard Practice. Where conditions of trenching are met which are beyond the scope of Standard Practice, i.e., trenches of depth greater than 20 feet, design of ground support must be provided by a Registered Professional Engineer. This will bring about a dual category of Qualified Person; a category for the person where the trench is greater than 20 feet in depth.

The reason given for deletion of Table P-2, Page 57, of the WORKING DRAFT^{1/} is that "Timber is not the only material used. Revised timber tables are in the Guidelines, Appendix B." This statement is confusing. Is deletion due to the fact that no "equivalence" is tolerated (in new rules)?

Dr. Felix Y. Yokel
Page 3
July 9, 1981

Descriptive terminology, it is felt, should be examined for clarity particularly in the use of such terms as "Safety Index," "Factory of Safety," "Compliance Measure," etc.

The WORKING DRAFT^{1/} lists twelve (12) timber sizes to be used to fabricate required shoring (see Tables B1, B2, B3 and B4). Few occasions will arise where the trenching contractor will use all the listed sizes for a particular trench project, but the various sizes must be available for use by the contractor in order to comply with the formulated rules. IND 6.^{2/} on the other hand, lists six (6) timber sizes.

On Page 29 of the WORKING DRAFT^{1/}, Table 51, refers to allowable stress in wood members. It is the feeling of this ad hoc Group that the Table is too refined when it is considered that in the State of Wisconsin wood shoring members are composed of wood which is not 'graded' with the exception of a critical visual examination at the time it is placed. The wood can be described as mixed hardwood, rough-sawed, and not formally graded.

In the WORKING DRAFT^{1/}, Page 11, Table 1, Soil Classification System for the Stand and Practice, an inconsistency presents itself. Soil Type C, Saturated, Submerged or Softway, at a trench depth of 12 feet or less, have a "steepest allowable slope hor.:ver. of 1-1/2:1." Our attention is then directed to a qualifying footnote for Soil Type C which describes this soil as ". . ." soils that cannot stand on a slope of 3 hor.:1 ver. without slumping (muck). It appears that we have here two definitions for Soil Type C. The ad hoc Group attempted a correlation between "soft" soil Table 1; and Table A.3, Page 42, in the WORKING DRAFT^{1/}. It is our feeling that soil classifications as presented in IND 6.^{2/} are more appropriate for use in the State of Wisconsin.

On Page 3, second paragraph of Dr. Yokel June 9, 1981, memorandum, reference is made to a 240 lb. gravity load placed at the center of trenching structures. The Wisconsin Trenching Code ad hoc Group is not familiar with the 240 lb. design requirement and would appreciate an explanation or the rationale. We have also noted that the AFL-CIO discussion prepared by Jack Mickle recommends a 500 lb. gravity load.

In summary, the good track record for trenching activity in Wisconsin has been a source of pride to this department and affirms our contention that the shoring and proposed requirements of IND 6.^{2/} are adequate for ground conditions found in Wisconsin. These items, which we feel will enhance our IND 6.^{2/}, have been set forth in this letter to you.

Since we are supportive of your work, and conscious of our own unique position in the matter of safety and trenching in Wisconsin, we will recommend all communications from you and your select committee.

Dr. Felix Y. Yokel
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July 9, 1981

Should the occasion arise for you to do so, please feel free to use or adapt in any way parts of IND 6.2^{1/}. Should you have any questions concerning this document (IND 6.2^{1/}), or find that we can be of assistance to you or your committee, please call us at (608) 266-1818.

Sincerely,


Gordon Helmeid, Director
Bureau of Technical Services

GH:lmb

cc: John Wenning
John Drake
John Ramage
Pete Gronbeck

1/WORKING DRAFT OF SUGGESTED REVISION OF SUB-PART, (p), OF THE SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION BASED ON BUILDING SCIENCE SERIES REPORTS BSS 127, by Dr. Felix Y. Yokel.

2/WISCONSIN ADMINISTRATIVE CODE SECTION IND 6, TRENCH, EXCAVATION AND TUNNEL CONSTRUCTION.

METROPOLITAN ST. LOUIS SEWER DISTRICT



July 13, 1981

National Bureau of Standards
U.S. Department of Commerce
Washington, D.C.

Ref: OSHA, Sub-Part "P", Suggested Revision

Gentlemen:

We have reviewed the working draft of the Sub-Part "P" revision as issued on February 20, 1981. As an agency charged with responsibilities for storm and sanitary sewerage in a metropolitan area with an old-core city, safety of personnel especially during maintenance is of primary importance. Of almost equal importance, however, is a continual lack of sufficient funding to do the quality job that we would like to do. Accordingly, our interest in this regulation is that its provisions be appropriate requirements for safety of personnel and also, that these requirements be not excessively demanding and therefore, not justifiably costly.

We feel that the draft, as presented with the basic Sub-Part "P" being supplemented by rather than including guidelines, is proper format for the regulation.

We regret that the original topic heading "Excavations, Trenching and Shoring" has been changed to "Excavations and Shoring" because the great majority of the site conditions in which we are involved, are trenching situations.

For trenching applications, as compared with excavations for building and other large area construction, with the difference in time span between starting excavation and backfilling, the more rapid trenching techniques used by the construction trades are successful because materials in which excavations are made, may have different physical properties over a short span of time of up to several days than when excavations are held open for months.

While much of our new construction is by contract with the private sector, with plans and specifications usually prepared by outside consultants working to our design guidelines, the

majority of maintenance work is done by our specially trained and equipped crews.

Many of our maintenance operations are in areas where previous construction has resulted in situations with subsurface conditions markedly different from a virgin site. Because of this, we feel that experience of alert construction personnel is at least as important as formal academic training. We strongly suggest that the abilities of the "competent person" or "qualified person", as defined in 1926.653, paragraphs (g) and (p), be used to indicate a more reliable and suitable responsible person that the definition in (h) of an "engineer" as a registered professional engineer. The intent of Sub-Part "P" of OSHA is to establish minimum requirements for safety of personnel working beneath the ground surface. Our operations are with experienced foremen working with stable, experienced crews. Most of these foremen, as well as members of their crews, have the abilities of "qualified persons" and the foremen have the authority of a "competent person".

In special situations, our competent foremen are aware of the effects of the history of other construction in the area as well as the indication of subsurface profiles or soil types. We feel that for safety, these people best satisfy the intent of Sub-Part "P", and more important, they are constantly present. The requirement of any additional qualifications or specialized persons, such as a "registered engineer" is an unnecessary and excessive cost which we can't afford.

We feel the "engineer" is the appropriate requirement rather than the "competent" or "qualified person", when design of restraining systems to protect structures which usually are adversely affected by any movement are needed. For construction activities with protection of personnel who reasonably are more mobile, the need is different and less severe. We understand that in technical terms the contrast between these two situations would be described as the difference between the "at rest" and "active" states of lateral pressures.

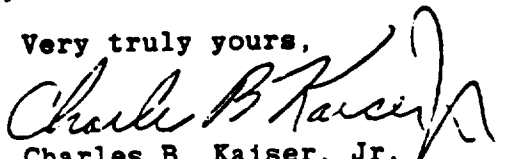
Since the great majority of our involvement is in trenching, the difference of stronger soil characteristics in short-term excavations must be recognized and we strongly endorse seven days as the suggested change from "short-term" to "long-term" situations (1926.653(m) and (t))

We urge that the revision of Sub-Part "P" be as indicated in the working draft with "qualified person" being used rather than "engineer" in Section 1926.653, subparagraphs 2, 3, 41, c and d and that "short-term" excavations as compared with "long-

National Bureau of Standards
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Page Three

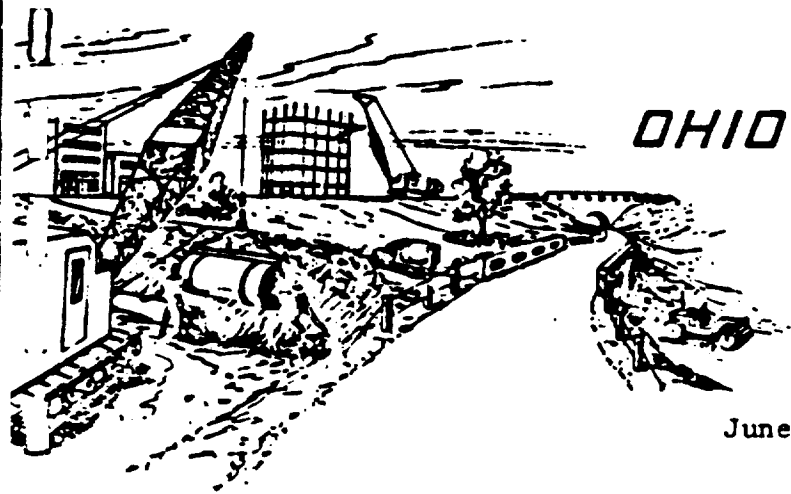
term" be defined as "seven days or less".

Very truly yours,



Charles B. Kaiser, Jr.
Assistant Executive Director
and General Counsel

CBK/kam



OHIO CONTRACTORS *Association*



THE NEIL HOUSE MOTOR HOTEL
COLUMBUS, OHIO 43215 • 228-6831
LONG DISTANCE TELEPHONE 800 282-1388

June 1, 1981

Mr. Felix Y. Yokel
U.S. DEPARTMENT OF COMMERCE
NBS Building Science Series 127
Washington, D.C. 20234

Dear Mr. Yokel:

A review has been made by our safety committee and others, of proposed subpart P. 1926.650 - .651 - .652. The Ohio Contractors Association represents 408 contractors in the state of Ohio. This response to this proposal should be considered as representative of our complete membership. The following is a summary of the evaluations by the membership of the proposed standards.

1. The intent of the revised changes of subpart P. to clarify and simplify the standards has in the main, failed. The main problem, that of soils classifications, has not accomplished its goal. The new descriptions are as confusing as the old, if not more so. Years of experience by "competent persons" indicate that the safety of persons in trenches with sides of "intact hard" soils need no more than a $\frac{1}{4}$ to one slope when the depth is 12 ft. or less.
2. Unanimous agreement of the need for section 1926.65a however we suggest changed wording as follows:
"Utility companies and municipally owned utilities shall be contacted and advised of proposed work prior to the start of actual excavation. Prior to opening an excavation effort shall be made to determine whether underground installations i.e. sewer, telephone, electric, water, fuel lines etc. will be encountered and if so where such underground installations are located".
3. Pg.7 .651(d) the wording is not clear and would imply that the backhoe digging the trench would be the cause for added shoring.

(Continued)



Pg.7 paragraph(g) should be deleted. The use of stop logs is not in common use by the industry and would create greater hazards, from the constant moving, than it would eliminate.

Pg.7 item(h) a better definition of conditions are needed to fully explain the intent of this paragraph.

Pg.7 paragraph(i) conflicts with provisions of the Clean Waters Act and is meaningless when it starts "If Possible".

Pg.7 paragraph(j) The procedures do not seem warranted in open cut trenching. What is meant by "Attended emergency rescue equipment?"

Pg.8 paragraph(r) the "5 ft." depth is consistent with other standards and is the level where a need would be greater.

Pg.8 paragraph(r) shoring members "secured to prevent failure" is unclear.

Pg.9 Trenching and Large excavations should be separately dealt-with by two distinct set of standards.

Pg.9 paragraph(a)(1)(b) a clearer definition of "unfractured rock" is needed.

Pg.9 paragraph(a)(2) we urge the adoption of the 24 ft. depth.

Pg.9 paragraph(a)(2)(a) the use of a "qualified person" is more practical, allowing immediate determinations and corrections in the field when questions arise.

Pg.10 paragraph(a)(3) we favor the 24 ft. depth in this item and the determination of proper protection by a qualified person."

Pg.10 paragraph(b)(1) 7 days would be a more practical time frame for short term excavations.

Pg.11 table 1 we urge $\frac{1}{2}$ to 1 slope in soils type A. and a separate table for short & long term excavations & trenches.

Pg.11 Notes item 4 the description is ambiguous and needs clarification.

(Continued)

Pg.12 the 3 ft. depth is too confining for many installations and conflicts with good engineering practice. The illustrations will create interpretation problems by persons unfamiliar with this type of work. The table in case IV should be revised.

Pg.14 & 15 this section has no practical use for field personnel and creates more confusion than it answers questions about safe procedures. Keep diagrams, tables and examples simple.

Pg.16 paragraph(c) we would prefer to use a "qualified person".

Pg.16 paragraph(5)(i) when this condition exists many times it is impossible because of pipes, lines or other devices to achieve this requirement.

Pg.16(5)(iii) the use of 3 ft. will give greater flexibility in various soil conditions without increasing hazard exposure.

Pg.17 b refer to Figure 4 pg.20.

Pg.18 Mass movement of Soi' or Rock definition will reduce interpretation of requirement.

Pg.19(b) A more comprehensive definition of "fractured rock" will eliminate interpretation confusion.

Pg.19 paragraph(m) 7 days should be used.

Pg.19 paragraph(t) 7 days should be used.

Pg.19 paragraph(x) include this definition with the definition of fractured rock.

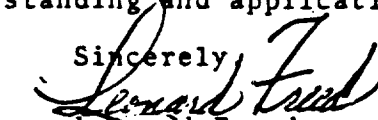
Pg.20 paragraph(bb) an example would clarify this definition.

Pg.21 thru 50 should be deleted. In our opinion this section has no practical application or use in the field. Many of the formulas and computations are available to engineers if there was a need.

Pg.57 table P-2 should be reworded to allow for greater spacing between shoring members to be able to handle longer lengths of pipe being used today.

These recommendations and suggestions are offered in the hope that they will contribute to increased understanding and application of regulations to improve safety.

Sincerely,


Leonard Freed
Manager of Safety