COMMENTS ON THE CODE OF RECOMMENDED PRACTICE FOR STANDARDS OF ACCURACY OF MAPS *

By Jay H. F. Clark, Member Connecticut Society Civil Engineers, and Assistant Engineer, The Connecticut Company, New Haven.

WHEN I learned that Mr. Sleath was going to present the foregoing paper, I thought it would be a good opportunity for the members of the Code Committee to get some ideas from this meeting on this subject. The Committee that prepared the Code has been made a standing committee of the Connecticut Technical Council. The Committee's function is to review the Code, find out how it is working among engineers and surveyors around the state, and see whether any revisions are necessary. Also, to find out whether or not it might be necessary or advisable to recommend the enactment of legislation on the subject.

In other words, if the Code proves to be satisfactory, as we think it will, and the majority of the engineers are known to be using it, except in a few isolated cases, would it be advisable for Technical Council to sponsor legislation so that its use may be universal throughout the state?

Up to the present time, the Committee feels that a voluntary method is preferable, but before discussing the Code further, I would like to make a few comments on Mr. Sleath's paper so you may see where we on the Committee differ with him.

In getting out the Code, the Committee had the same purpose as Mr. Sleath. In other words, he recommends tolerances for the surveyor, while the purpose of the Code is to present uniform methods and procedures by which maps may be classified.

There are a few points in which we differ from Mr. Sleath, and I wish to mention these at this time.

Mr. Sleath recommends five methods of surveying, the first three being those used in the United States Coast and Geodetic Survey and dealing with precise work. The Committee felt that precise surveying was so rarely used here in Connecticut that one classification could take care of it. Mr. Sleath calls each method an "order"; we call it a "classification"

Any surveyor who gets into precise surveying, as Mr. Charles Cooke, of Hartford, for instance, whom we consider one of the leading authorities

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in Connecticut in this type of work, will tell you, would naturally get his methods from the United States Coast and Geodetic Survey, or the American Society of Civil Engineers Manual. He would follow those rigidly and put on his map all of the required information as outlined therein. But, as far as the classification of maps are concerned, the Code Committee did not feel it necessary to require Connecticut members of the engineering profession to go into that detail, on the average map, unless they were doing precise work.

The Committee decided on certain ratios which differ from those Mr. Sleath has recommended to you today, but that is a point on which there is a considerable difference of opinion and I therefore do not care to get into a discussion on it.

In support of the Committee's stand, however, I would say that we consulted a great many engineers and surveyors around the state, before setting up our recommendation of ratios and thought therefore they covered the situation.

There is another point in particular that I wish to bring out which differs in Mr. Sleath's paper from what the Committee advocated. We have recommended that only one letter with a numeral should be put on the map. It is a very simple way to show what tolerances have been used in connection with surveys and in what classification of accuracy the map belongs. We feel that the average surveyor will not care to take the time to put on his maps all the information suggested by Mr. Sleath. In fact, I have found in talking to various engineers and surveyors around the state, that the very simplicity of the Code has been its salvation and that the average user does not want to be tied down to including a large amount of detail on his map which would normally be required on precise work only. The Code has the detail which the Committee believes sufficient.

We have gotten started on the classification of maps according to their accuracy, through the Code, which is the same objective as advocated by Mr. Sleath, although he has put it in a different way. We agree with him a hundred per cent in principle.

The Committee feels that with recommendations from engineres and surveyors around the state, we will be able to revise the Code. Perhaps some of the classifications should be split up. There may be various other revisions which might be suggested. We have no knowledge of a Code of this nature having ever been started before, so it is natural that there may be some changes necessary. We agree with Mr. Sleath that it is an important matter on which something should be done. We feel, however, that the Code is the answer and should be revised, if necessary, until it is in the form desired by the engineers and surveyors of our state.

Those are all the comments I have to make on Mr. Sleath's paper. I think he has done an excellent job and I hope our members will all follow his recommendation and take this matter seriously in seeing that something, either the Code in its present form or some revision of it, is used to indicate the accuracy of maps.

It is unnecessary for me, and it would be only a matter of repetition if I should go over the advantages of a Code because that is all in the foreword in the front of the Code pamphlet.

The foreword gives the advantages, and also how the Code originated. There is one point, however, that I spoke of a moment ago which I think should be emphasized—and that is the very simplicity of it. If we have a code so easy for a surveyor to follow, perhaps using a rubber stamp on his map and inserting the required insignia as it may be, he will not hesitate to use it, especially after he gets so familiar with the Code that it will be unnecessary to ever refer to it in classifying his maps.

I therefore feel that if surveyors in general will take it seriously and use a small amount of time to put the designating letter on the map it will give future generations an opportunity to know for what purpose and how accurately the map was made.

There is something else I wish to bring out, also. The Code Committee did not want to force or in any way try to tell anyone what kind of a survey he should make. If you care to make a rough survey of any kind, and leave off certain data, you can comply with the Code and do so. It does not try to tell you what to do, but merely requests you to put that classifying letter on the map to let others know what you have done.

Some have objected to the Code because they did not wish to show that certain low standards of accuracy had been used. It is not the objective of the Code to force a higher degree of work in any case, although eventually it will raise the standards. You make the survey you like, but let everybody know what you did. In doing this, I am sure you will accomplish a better job because, naturally, you will want to get your map in a higher classification and the general trend will be for better work in our state.

At this time there are a few points that I would like to ask you to discuss and give the Committee the benefit of your experience. The Committee has been made a standing committee to revise the Code and make recommendations to Technical Council later on, and it would be very helpful to know the opinion you and other engineers around the state have on this matter. May I ask if there is anyone here who is doing surveying work and does not use the Code? If so, we would appreciate it if you would tell us why you are not using it, so that we can correct any defects or otherwise make needed revisions.

In the absence of hearing from anyone, we will assume that you do use it, or else your professional work does not include surveying. It is very gratifying to know that there is no one here who does surveying and does not use the Code.

As you do use the Code, will you help the Committee by giving us recommendations where you think it could be improved? Are there any classifications that may need splitting up? Or is there anything else about it that could be improved?

Of course, it is unnecessary to say that when the Committee considers any possible revisions, we will be only too glad to give Mr. Sleath's recommendations due consideration.

Have any of you any other suggestions, other than Mr. Sleath's.

DISCUSSION

MR. F. J. TROWBRIDGE: Mr. Clark, as you already know, I have adopted the major recommendations of the Code in my work and you have seen a sample of the rubber stamp that has been used by my office which is identically the wording used in the Code pamphlet.

In regard to the various classifications, there is one recommendation which I think would be advantageous. That is, to have one in between numbers two and a three.

Class A-2, according to my remembrance, allows an error of closure of one in five thousand. A-3 an error of closure of one in one thousand. I think if we had an intermediate one in three thousand, it would fill a need for that classification. Mr. Sleath has practically recommended that in his order of one in 2,500.

MR. CLARK: That point is well taken and since the Code has been presented, I had thought of that also. That it might be advantageous to have another classification.

MR. TROWBRIDGE: One further suggestion that I would like to make relative to the question which you just put to the assembly here as to who was or was not using the Code standards, is that you ask the assembly who is not using the stamp on their maps, and why.

MR. CLARK: You mean a rubber stamp?

MR. TROWBRIDGE: Yes, or a similar designation.

MR. CLARK: I do not think it matters whether you use a rubber stamp or whether you letter the information on your tracing.

MR. TROWBRIDGE: I said "some similar designation."

MR. CLARK: It is immaterial. In fact, the Code says that, so I would not feel it would be necessary to ask the assembly here whether the surveyors among us use a rubber stamp or not. If you wish, though, I will do so.

MR. TROWBRIDGE: I meant by that question to say "some similar designation". It might be hand-lettered, but any definite designation of the Code classification.

MR. CLARK: That is the same thing as saying, "Do you use the Code", is it not?

MR. TROWBRIDGE: Yes. But, I think there is a differentiation there. A man might use the Code but not so designate on his map.

MR. CLARK: Then I do not feel that he is using the Code; unless he puts the designation on his map.

MR. TROWBRIDGE: I agree with you there.

MR. CLARK: But that is the objective of the Code, is it not? To show the accuracy of the map on the map itself?

MR. TROWBRIDGE: That is true, but I am very much interested to know how many you know who are using some such designation.

Now, I have written to inform the Board of Registration of my conformity to the Code of Standards and the method which I am using, and using a rubber stamp with a space for the Code designation. So far, in my observation around the state, I have come across no maps by any other surveyor which has that designation on it.

MR. CLARK: You mean the Code designation?

MR. TROWBRIDGE: Yes.

MR. CLARK: That is not very encouraging.

MR. TROWBRIDGE: And neither has the Board of Registration heard of any.

MR. JOHN H. KEITHLINE: I quite agree with this last gentleman. I use the Code myself. I think it has genuine merit for this reason. Naturally, before making a survey, you do a certain amount of title searching or record searching, and, in the course of your searching, you look for other surveys. Now, you may pick up one or two, and after you have worked in the field and collected your data, you wonder with what degree of accuracy these former surveys were made. Many times you do not quite check with them in your field work, if you are doing some precise work. I think for that reason it is an excellent step. I wish everyone would use it.

However, I also take particular notice when I am searching the records to see whether or not any others are using the Code. I have failed to find any in Hartford. That does not mean that they are not doing so. It may mean that I have just not found them. There may be lots of them. But I am just saying this because I am trying to also encourage the use of it.

MR. CLARK: I am sure there are some around Hartford who are using it, Mr. Keithline, because there are several members of the Committee who are from Hartford and vicinity and they at least must be using it. Well, that is one of the things we want to find out. If the engineers do not feel it is worth while, then the Technical Council might just as well drop it.

MR. KEITHLINE: It is well worth while in my opinion.

MR. CLARK: For the reasons that you have given, as well as many others that Mr. Sleath gave, and that the Committee has brought out in the foreword, we feel that the classification of maps as to their accuracy is a very important and a valuable step forward in our profession.

MR. CHARLES COOKE: On the other side of that equasion, I would like to say this: In the City Engineer's Office in Hartford, we are going to use this Code wherever it can be applied. Most of the survey work that is done in an office of this kind is in addition to something which was done before, but where a complete survey is made,

something that is a complete unit in itself and the Code is applicable, it is going to be used.

MR. CLARK: Are there any other comments?

MR. ROBERTS (of Wethersfield): I think part of the confusion, if any, perhaps lies in the fact that private engineers have received the Code with the thought that it was more of a suggestion or Recommended Practice. They did not realize that the Committee expected them to start right in using it. I have applied it in a number of cases, but each time I applied it, I wondered whether I really should or not. I think there has been some misunderstanding in that regard. I know several engineers who have not really considered it as being in effect yet.

MR. CLARK: We will take that up with the Registration Board at some later date and if possible see that they all are notified that the Code is in effect, even though that was done before—it could be done again to avoid any misunderstanding.

MR. ROBERTS: I think a great many engineers tried to do exactly as the Code recommends before the Code put out that recommendation. Then when it came along they considered it was a recommended suggestion to improve the work, approved by Technical Council but not yet put into effect as an adopted standard, pending a tryout. We want to know whether we should mark it on the maps or not.

MR. CHARLES CAHN: The engineers around New Haven, in part, are using it. I know that V. B. Clark and Blair Associates are using it. My office has used it in part and I find it very helpful, particularly in estimating prices on work, especially with out of town engineering firms and lending institutions relative to the type of survey that they want.

With reference to Mr. Roberts not using it immediately, one of the things that I fought against was the injection of this into a law and forcing it on the men. I greatly fear that something of that sort will be just like prohibition over again.

MR. CLARK: You know that the Committee has recommended a voluntary procedure as now in use, and we hope that we will be able to continue that way.

MR. ERNEST C. DABOLL: We have a great deal of survey work to do for our clients, and I have always made it a point to do work with the degree of accuracy that I thought was necessary for the particular job. If it was city work, I kept the standard up to a very high standard, but on country surveys I have never considered there was any need of such a degree of accuracy.

I was rather amused the other day. My friend on the right was speaking about looking up deeds. Of course, that is one of the fundamental things in survey work: to look up the deeds. A map of a piece of property that I surveyed the other day had no dimensions on it whatsoever, so we looked away back some 60 years before we found any. Then I located a deed which gave distances and angles on all the lines, deflection angles to minutes, and distances to one hundredth of a foot.

I went on the job and ran out the lines on that basis. I found the angles agreed very nicely, but closure on that small plot, which was about 300 feet by 150 feet, was six-tenths of a foot. Therefore, the question is: Where should that error be placed? Should we, in this case, assume that the angles which they mentioned were correct and disregard the distances although they were given to hundredths of a foot, or should we assume that it was so far back so that they probably used cloth tapes, and the error probably lay there?

I came to the conclusion that the error really lay in the inaccuracy of the tapes that had been used.

That is just one of thousands of cases that I have had in my survey practice. As I say, I never bothered with any particular code, only to try to keep the accuracy of the work up to what was required.

MR. CLARK: You are in favor of the Code, Mr. Daboll?

MR. DABOLL: In a general way, yes. I think it is good. Because for future work, as has been brought out, it would be a good thing for people to know the accuracy of the work that has been done previously. Generally, I never considered an error of one in five thousand sufficiently close for ordinary work. Of course, aside from foundation work or things of that sort where we measure base lines very carefully with a much greater degree of accuracy, we never try to work any closer than that. On farm surveys, I have always considered that if we were sure that a survey checked to within a tenth of a foot where you are depending on the center stone walls or things of that kind, it is near enough.

MR. CLARK: I think the trouble you had, Mr. Daboll, with that map is a pretty good argument for the Code. If there had been a Code at that time, the map in question would have been marked and you would have known what accuracy was used in its preparation.

MR. DABOLL: That is so.

MR. CLARK: We hope in future years that engineers will know what degree of accuracy we used in preparing our maps by the use of such insignia as is recommended in the Code.

MR. DABOLL. What I want to bring out is the fact that even though they aimed for the accuracy in those days, and were working with the very best instruments they had, and supposed they were working accurately down to measurements of a hundreth of a foot. In reality, as I said, I found six-tenths of a foot error in that small survey.

MR. CLARK: Has anyone else any comments on this subject?

MR. TROWBRIDGE: I do not want to say too much, or monopolize this discussion, but this is a subject that I have had greatly at heart for a good many years. The establishment of this Code has been the consummation of some of those ideas. I will say, first, that this subject is worthy of a good deal more time than we have apportioned to it today, and it will be worthy of a good half day of a session of this Society at any time, in order to get things down to a thoroughly satisfactory basis.

As to Mr. Daboll's experience with other surveys: I say he is getting off easy to find only six-tenths of a foot variation. I could tell you stories from now to this time next week of errors and omissions which I have discovered in the research of records.

There was one case where two adjacent surveys were made by the same surveyor, and the bearing on the same line varied twenty degrees. That is absolutely inexcusable, in my opinion.

In another case, where you can prove up the accuracy of a former survey by making a traverse on the recorded map yourself on the ground. If they do not coincide with the measurements on the map, you can tell very quickly there is something wrong.

Another case was a survey which was made and a map filed. I tried to connect with it on the ground and was not able to make distances coincide at all. Before I calculated my own traverse on this survey, it did not close within three or four feet.

Now, there is a crying need for a lot of improvement in this work. When you run up against conditions of that sort, it certainly emphasizes the need for compulsion in the maintenance of these standards.

The surveyor who made the survey which I mentioned, after my calculation of the traverse on his work did not close within three or four feet, made this statement to me at one time which would indicate his standard of operation: That he generally left off one dimension or one angle on his surveys so that somebody else could not take advantage of his work.

MR. CLARK: You have given us some good ideas, Mr. Trowbridge.

MR. TROWBRIDGE: I could tell you stories till this time next week. That is why I say this subject is worthy of much more discussion than we are giving it today.

MR. CLARK: We can not settle everything today.

MR. TROWBRIDGE: That is true, but I wish we could bring some pressure to bear to settle faulty practice for that sort.

MR. CLARK: The Code is trying to do the best it can, but I do not think it can go that far without cooperation. We have taken a step forward, anyhow.

MR. KEITHLINE: If I may be heard just a moment. I think that the degree of accuracy depends, of course, on the purpose of the survey, but then, again, I think that the degree of accuracy also depends upon the deed. Now, it takes a lot of time and it is rather a costly process to balance most surfaces, especially if you have a large area. Again, it is a very difficult matter to go out and sell the layman the idea of paying for this office work that he does not see. I should like, sometime, to have this organization discuss fees in relation to survey work. I think that most of us would be interested.

MR. CLARK: That recommendation could be made to the Papers Committee in the future.

MR. TROWBRIDGE: I am glad Mr. Keithline brought that up. Fees are definitely one factor in the degree of accuracy to which surveys are made; namely, what your client is willing to pay for.

MR. CLARK: If there are no further remarks, I want to thank you all for your interest in the subject as I did not expect to receive so many helpful comments and appreciate it very much. And these transcribed notes will be of considerable help to the Committee at some future date when we are making recommendations to the Technical Council.

MR. TROWBRIDGE: Mr. Clark, just one word more. If the Connecticut Technical Council has any inclination to sidetrack this Code, I shall fight it tooth and nail. I think we should fight hard to maintain this standard, and even for higher standards than are set in the Code. Our reputation is depending on it.

MR. CLARK: Thank you again. I guess that concludes my remarks. Thank you, Mr. Chairman.

CHAIRMAN SUMNER: Thank you, Jay.

Mr. Sleath, would you wish to comment a little further after hearing Mr. Clark's remarks on your paper?

MR. SLEATH: These comments will be very brief. I want you to consider them very seriously, nevertheless. The time is short, we are hungry, and while I would like to drill them into you, I am not going to do it because of the lateness of the hour.

One: I think we should use very simple and very indicative ways of grading our maps and surveys such as 1, 2, 3, 4, 5. I say this because the government went through the same thing. They used to call their surveys Primary, Secondary, and Tertiary.

Another thing, 1, 2, 3, 4, and 5 will fit into a national map program covering degree of accuracy of surveys. I think we should use it for that reason.

Mr. Clark said something about precision. I should like to say that twenty years ago, old Joe Reynolds of the City of Waterbury was doing third order traverse in laying out the city streets of Waterbury. I do not doubt but what today he was using second order traverse. Precision of second and third order traverse is not at all unusual. It is quite common. Perhaps first order traverse is unnecessary for Connecticut surveyors.