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## **Project and Decision Making**

- Moderator:** Jack H. Willenbrock, Prof. Dr.  
Pennsylvania Univ.; University Park, PA, USA
- Panelists:** Roger A. Dorton, Mgr. Structural Office  
Minist. of Transp. and Communic.; Downsview, ON, Canada  
Hans Knöpfel, Lecturer  
Swiss Fed. Inst. of Technology; Zürich, Switzerland  
Niilo Kurvinen, Vice President  
YIT OY; Helsinki, Finland  
Ryoji Nishihara, Gen. Mgr.  
Shimizu Constr. Co.; Tokyo, Japan  
T. N. Subba Rao, Managing Dir.  
Gammon India Ltd.; Bombay, India
- Taking part in the discussion from the floor:**  
L. Vu Hong, France  
B.P. Wex, UK

**J. WILLENBROCK, USA, MODERATOR**

I would like to begin this panel discussion by introducing the panel members. The first one is Mr. Kurvinen, who is the Vice-President of YIT Limited General Engineering and Contracting Company in Helsinki, Finland. The next panelist is Mr. Subba Rao, who is the Managing Director of the Gammon India Limited Contracting and Consulting Company in Bombay, India. The third panelist is Hans Knöpfel who is with the Swiss Federal Institute of Technology in Zurich, Switzerland. The fourth person on the panel is Mr. Nishihara, who is the General Manager of the Quality Assurance Management Department, Shmizu Construction Company Limited, Tokyo, Japan (with his interpreter Mr. Takahashi). The final panelist is Mr. Dorton who is the Manager of the Structural Office, Ministry of Transportation and Communication in Ontario, Canada.

As I was developing a theme for this panel, I decided to provide each of the speakers with an assignment. The assignment was transmitted to them several months ago. It dealt with my feeling that within the area of quality there are some procedures that are culturally dependent. They apply only to the country in which they are practiced. There are other quality characteristics and procedures, however, that are universal. I asked each of the panelists to review a specific paper that had been presented and to identify those quality practices and procedures that are culturally dependent and can, therefore, not be applied in other countries as well as the quality practices and procedures that are universal and can be applied in other countries. What I would like to do at this time is give each of the panelists about four minutes to present their findings and then we will open it up to a discussion from the floor to perhaps expand upon those comments. We will begin with Mr. Kurvinen.

**N. KURVINEN, Finland**

There are four aspects which are different in different countries, First, the manner of inspection by authorities. There are a numbers of laws, codes, licences clearly different in different countries. In selecting contractors, the type of prequalification is very different, too.

Further, the way to execute projects is different. In some countries it is quite normal to employ many sub-contractors and the general contractors' staff is small. In other countries one organization will do the whole work.

Third, labourers, labour staff, and labour unions are different. The influence of the unions on the work is unfortunately very essential. The skill of labourers is of course different and in some projects you cannot use local staff. In the Soviet Union, for instance, you have to take your own staff. In Middle East projects it is better to look for labour staff in third countries.

The fourth area, where differences may occur, is the handing in or taking over of the completed work. On Soviet projects there is a special committee that very often has not been involved in the project. It comes at the end and reads the documents and decides if it is OK or not. In the Middle East it very often turns out to be a commercial discussion which may take a very long time. It is often a question of responsibility: who will be responsible and possibly feels scared to take the responsibility.



There are some aspects which are more similar in different countries. I mention for instance basic materials. If you buy reinforcement steel from India, France, Scandinavia or the Soviet Union, you do not take very big risks. There are differences, but basically the quality of steel, cement and timber are similar. It is the same with equipment. You only need to know which type you need and where.

Nowadays the project management systems and the control systems using computers in many countries, will also have the same logic.

In general, I would finally say that work planning and the degree of planning are very important. With good planning you can reach something or you can avoid something. Still it is usually not the technique, it is not the machine which goes wrong, it is the man - it is the human being - and that is why it is necessary everywhere to keep the organization well informed of what is going on, what is the problem, what are the targets, what is the meaning of quality in order to keep all the people, including labour staff, well motivated and proud of their work. Only in this way you can have the best possibilities to succeed.

#### MODERATOR

Thank you very much. As the second panelist I would like to ask Mr. Nishihara to comment on the paper of Mr. Dorton.

#### R. NISHIHARA, Japan

My assignment is to review the presentation made by Mr. Dorton of Canada, entitled "Safety Considerations for the Burlington Skyway Project" (and published in the Symposium Preliminary Report, pp. 39-46) and to identify some points concerning his presentation.

First, the points that do not apply in Japan:

In Japan we do not have alternative design bidding in which a bidder can select any one design out of the four designs offered by the ministry. We do not have such a system in Japan. For smaller projects, however, the contractors may propose an alternative design with minor modifications or improvements but the basic design remains unchanged. We do not use the value engineering approach or alternative designs, or optional bidding in this country, particularly in the public work sector.

In the private sector there is a growing tendency for contractors to propose an alternative design or engineering method. When it comes to negotiations between two parties, however, it is still practiced on a unilateral or onesided basis. In other words, the client still dictates to the contractor what to do and the contractor can only listen and agree.

At each stage everyone does his best in terms of quality assurance and then passes it to the next party or the next stage, where the person in charge again does his best in terms of quality assurance. As a consequence, we are all, particularly the client, rewarded with the quality required.

Now about quality practices and procedures that we do have in common: the specific quality required for any structure is completely laid out on the drawings. Sometimes even the methods to achieve that will also be specified in the contract documents.



We do have competitive bidding practice in Japan, in which case qualified bidders are selected and invited to bid. The bid prices are evaluated against estimated prices or the budget, although there are some different ways of implementing this evaluation. We also have the low price limit within the predetermined price range to evaluate the bid prices. A contractor will also be evaluated to determine if he is qualified for the work, by checking the quality of his work or his ability to complete the work in time or within the terms of payment etc.

Finally, the client, or owner, provides supervision over the project based on his engineering standards.

#### MODERATOR

Thank you. The third panelist is Dr. Knöpfel who will review and report on the paper of Mr. Yamane and Mr. Nishihara.

#### H. KNÖPFEL, Switzerland

I have arranged my comments to the papers of Mr. Yamane, Mr. Yoshida and Mr. Nishihara into three sections.

First, concepts that have not been used so much in my range of experience are

- competitive bidding by nominated bidders and nominations made by prequalification,
- supplying materials purchased by the owner, and lending large items of equipment to the contractors by the owner,
- to do the business of contracting for construction works only if you have a license, under the construction business act for example. Licensing for contractors is not common,
- at the time of concluding the contract, the method of execution of works and the control method are provided as a requirement. Often we just define the result and not the method of working, the contractor is completely responsible for the way of achieving certain results, and
- the lump sum is used almost always as a method of fixing the construction price. That is not the case in Switzerland. We have, for the works referred to here, mostly unit prices.

Second, concepts that have been used very frequently in my range of experience are -

- the basic concept of Mr. Yamane's paper, including integrated consideration at all phases of the project - the planning, design, construction, maintenance and operation,
- the establishment of standards and specifications for design, construction and maintenance is also quite common, incorporating a wide range and multi-disciplinary knowledge,
- careful design of construction methods and, if newly developed, testing using experimental constructions,

- design of the structures by good consultants. The contractor is held responsible for quality control of construction. Confirmation of the performance by inspection from the owner's side, and
- the sliding scale clause for compensation of inflation. After a lapse, for example, of 12 months from the date of the contract basis.

Let me emphasize that "not frequently used in my range of experience" does not mean "poor"; and "frequently used" does not equal "good". Project organization depends on local conditions and contracting has not been investigated and compared well enough internationally to propose an optimal solution.

Third, I turn to two concepts that did not come up in the above-mentioned paper. I put them as questions here -

- is the fast track concept an ingredient of the actual state of the art or has it a deteriorating effect on quality as a rule? Is the traditional approach the expression of modest project management knowledge, is it out-dated?
- should the public owner be allowed to give the work not to the lowest bidder under certain conditions, and should he have to show evidence that these conditions apply?

#### MODERATOR

Thank you. The fourth panelist is Mr. Subba Rao who will comment on the papers of Mr. Dorton and Mr. Sriskandan.

**T.N. SUBBA RAO, India**

I turn to the paper by Mr. Sriskandan first. His report on tendering practices with a view to providing a measure of quality assurance at the very outset of a contract brings out the present state of the art in Great Britain and to a great extent the Commonwealth countries.

Of particular interest is the observation that all design and construction should be independently checked. Consultancy is contracted out to consulting engineers and the consultant so appointed is responsible to the owner only but he has also responsibility to society.

A very important aspect Mr. Sriskandan has highlighted and which is indeed a very important factor - insofar as developing countries are concerned, where the hunger for shelter with low cost housing schemes is paramount - is the responsibility of the developer to the ultimate user. The developers invariably put up the least at as minimum costs as possible and at as fast a pace as possible. Finally, the wanting population purchases it to gain a measure of shelter but find, after a period of time, that what they bought has already started providing tremendous problems for their living and that the comfort they purchased is not there. For this, who is responsible, and, what kind of independent checks are required?

Now, I would like to get back to Mr. Dorton's paper to the extent it has not been covered by Mr. Nishihara. His proposition that in his country no alternative design will be allowed is also the Japanese





practice and which Mr. Dorton defends in his paper as contributing, eventually, to safety, i.e. no claims from the contractor, cost savings and the like. Is it a procedure in the right direction? Does this not inhibit creative thinking, does this not prohibit development of new technologies?

But the most important message which I take home with me, is the message given by Mr. Meseguer about the triangle of balance between the user, the ideas which should manifest themselves, and ultimately, the persons involved. They form, in my opinion, the trinity of tot for quality assurance. It is my attitude that the training you receive inhouse, the traditions that you want to maintain in the company, these are the basic modulations. They could surface themselves in several ways but eventually it boils down to the basic component - the human being and his attitude. So long as that is not right, the eventual result can never be right. What shall be your specifications, what shall be your quality assurance programs?

One word to prequalification: when you prequalify a contractor as you normally prequalify a consultant, you should ask the contractor what kind of works he has performed before, obtain credentials of his past works from the authorities concerned, find out what kind of manpower and resources, financial and material and plant resources, he has or can lay his hands on. If he does not have any technology inhouse, which sub-contractors is he going to employ - all to give the client the desired quality assurance. Much of it has been practiced on the Burlington Skyway Bridge and Mr. Dorton's reference to it is indeed very revealing.

#### MODERATOR

As the last panelist I would like to ask Mr. Dorton to comment on the paper of Mr. Colenbrander on the Eastern Scheldt Project (published in the Symposium Preliminary Report, pp. 31-38).

#### R.A. DORTON, Canada

The paper falls quite well into the categories the Chairman had asked us to consider of those procedures that are culturally dependent and those that can have universal application. I have expanded a little on the term "culturally dependent" to include, say, project dependent because of the complexity or sheer size of the project that Mr. Colenbrander indicated. There is one such item, being a multi-billion Dollar contract, each project manager (5 of them) was responsible for developing the quality assurance requirements for his own field. I think this is a concept that was applicable to this project but is not likely to come up on the general projects we are involved in.

One item that was unique to my knowledge was the idea of audit days. This was applied to very complicated procedures. They in fact invited outside experts to come and witness the actual project implementation and to provide their expert advice right on the site. Finally, there was an element of quality assurance that, I hope, was peculiar to this project and which I would suggest should not be implemented elsewhere, namely involving the Parliament in the quality assurance program.

Turning to the items in that paper that are common and can be applied almost universally, the question of the feed-back loop principle was defined by Mr. Colanbrander. Critical parts were



subject to an independent outside design check, which most of us think is an important aspect and can be applied universally.

A training school was established at the start of the concrete construction for both skilled and unskilled staff. We may think that this is perhaps only justified on a large project. It is perhaps something that could be considered on smaller projects, too, in order to improve quality.

The design expertise was represented in the field as part of the quality assurance program. Often on other projects the design capability has been separated from the construction capabilities. This aspect is independent of size and could well be followed on all projects. Finally quality assurance extended to the operational phase with the issuing of a maintenance handbook, this has come up before here and I think this is a very important extension of the quality assurance principles.

#### MODERATOR

Thank you Mr. Dorton. Is there somebody in the audience who would like to react to one of the panelists?

#### B.P. WEX, UK

First of all to Mr. Subba Rao and his sound advice about prequalification of contractors. His advice was to the engineer: Look and see what the contractor has done before, get his record. That's fine. You put up your list of prequalified contractors and then the client, who is powerful, says to his engineer - and I am talking about not in the U.K. but in countries in the great wide world, where it can be rough - I want "so and so" included. I would like to know how Mr. Subba Rao proposes to get over that kind of arm twisting. Unfortunately, the engineer, in many countries, no longer has the power that he used to. This is not in the interest of the people at large and it is not in the interest of the client, but I do not know how to get over it. That is point 1.

Point 2 is, Mr. Subba Rao again, about alternative designs. I am sure we all agree, consultants, contractors, clients alike that, where the circumstances are appropriate, alternative designs are desirable. It keeps us all on our toes and if we are frightened of alternative designs that means we feel that we are not on our toes. So I absolutely agree that should be done where appropriate. But I think, I may have misunderstood Mr. Nishihara, and this is where I may be off track. I understood him to say that in Japan it is possible for the contractor to change parts of a design without further reference to the designer. That there would not be an overall change in concept but parts could be changed without reference to the designer. Now, if I am wrong, I withdraw the question. But if I am right, I would like to say that this must surely confuse responsibility enormously and I would come back to Mr. Sriskandan's point made in his paper, that any design change should be referred to the designer for his approval so that the responsibility for the design finally remains with the designer. That in my opinion is the only way to assure the quality of the design by avoiding splitting responsibility.

#### T.N. SUBBA RAO, India

Yes, Mr. Wex, regarding the point which I have to answer, when you have political pressures to include a non-qualified contractor. If





you have detailed the several requirements, I am sure, he will automatically not get included. But with the political interference, you still have a very strong position to prevail on the owner not to include him. But if the client still feels, well it's political, they must open his bid, I am afraid there is nothing in the world that you can do about it, but inform the client about the limits of your responsibility on the project in no uncertain terms. That is the only solution I can think of.

**MODERATOR**

Mr. Nishihara, would you like to comment on the question about the opportunity for a contractor to revise part of the design.

**R. NISHIHARA, Japan**

I am afraid, there is some misunderstanding that contractors are allowed to revise a part of the design without the consent of the designer. This is wrong. We still have to have the consent of the designer.

**L. VU HONG, France**

I would like the panelists to give their opinion on the conclusion made by Mr. Sriskandan. This conclusion is that the whole process of design and construction must be subject to independent control. So if possible, we could get one opinion from the people of the East and one from the West on what would be the degree of this independence. I am not sure that the completely independent check will contribute to achieve quality. In more than one occasion, we had encountered the situation where the man who performed the work says: "OK I am not responsible for the quality, because someone else will check it." You know what the result will be.

**MODERATOR**

I think this is a very good question with which to end this part of the panel discussion. Mr. Dorton, what is your reaction to the idea of independence and independent check for each party?

**R.A. DORTON, Canada**

I agree with the comment by Mr. Vu Hong and I have experienced that in my own government department, where we have to check all municipal designs as part of our mandate. We realize that we frequently get poor design because they know that their designs are going to be checked by our department. But I think, when we are dealing with major projects, there is a growing tendency to require an independent check. I think this is an essential part of the quality assurance, when we are dealing with either very unusual projects or projects where there is rather a large element of risk being involved or very large expenditures. I think it is really dependent on the size of the project.

**MODERATOR**

Mr. Nishihara, would you like to comment on your feeling of the need for independence and independent check.

**R. NISHIHARA, Japan**

I think it is necessary. Generally in Japan, within a company, there is an independent group of prestigious experts who conduct the checking. The kind of checking that they do is to see that the design criteria are in conformity with the required quality. The opinion expressed by this group of experts must be adhered to and



the data that this group provides is very important, because these data serve for improvement in the future so that faults or errors are not repeated. We call this work the "design review". This is common practice in Japan.

**H. KNÖPFEL, Switzerland**

I would recommend independent checking, but I would say that the result of the independent check is a recommendation. It should not be decided until the designer agrees.

**T.N. SUBBA RAO, India**

An independent check, whether it is at the stage of design or construction, should be welcomed. It is some kind of a technical audit. I am sure it will greatly improve the quality assurance program.

**MODERATOR**

OK - the moderator of the panel has the final say and I will now give you an assignment. You realize that I am a Professor of Civil Engineering at the Pennsylvania State University. If you think back to your school days, a Professor always gives a homework assignment. One of the major benefits of a conference like this is not necessarily what you hear in this room, but the discussion that follows afterwards. If you leave this room and decide to think about many other things tonight, other than what was discussed here, you are not carrying out my assignment. I wish I could require you to discuss with some other people tonight some of these issues that have been raised. You will see some of the panelists at the reception tonight. You will also see some of the speakers. This is your opportunity to interact with those people. If you do not carry out some discussion related to these topics, I will give you a poor grade and you will fail this panel discussion.

Thank you very much for your attention.

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