

P. N. PAUL & J. F. BATES

a discussion: *British consulting engineers in Arab States*

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The CHAIRMAN suggested that the discussion should be confined to the water cycle. The introductory speakers, Mr Paul and Mr Bates, were partners in firms very actively engaged in Saudi Arabia, the Gulf and North Africa.

2. Mr P.N. PAUL said the Conference discussions had so far been orientated towards water, waste and health in the poorer countries of the world. During this session they would be turning towards countries which had just about the highest gross national products in the world. With the enormous increase in spending power, the oil-rich Arab States had now embarked on a crash programme of construction aimed at transforming their countries into the industrialised nations of tomorrow. The vast oil revenue had encouraged the establishment of welfare states with heavy expenditure on water and sewerage, and other facilities necessary to develop their infra-structures. British consulting engineers had not been slow to take advantage of this market, and had been given a major part of the public health engineering schemes emanating from the Arab States during the past five to ten years.

3. It was difficult to generalise on methods of obtaining new work because of the great variation from one country to another. Procedures had certainly changed from ten to twenty years ago when firms were normally selected on the basis of their reputation

alone and not on the basis of cost. Then there was little effort made by consultants to obtain work in the Arab States; firms would receive a letter saying they had been appointed and would they please go and sign the agreement. Nowadays it was the practice either for clients to approach a number of pre-selected firms, or more commonly to advertise locally asking for consulting engineers who wished to tender for services. Consulting engineers now had to chase prospective clients. This could be a long and expensive process, particularly if a firm had not operated in a country before, and therefore did not have the necessary contacts to gain access to the people who really mattered. Often two or three years were spent chasing a particular job. Thus a considerable capital expenditure and investment should be anticipated in order to obtain a job. Competition was keen: over eighty firms of consultants specialising in public health engineering were registered in Saudi Arabia but less than ten were currently working on active schemes.

4. Consultants had first to put in submissions stating how they proposed to undertake the work, any aspects which would require special study, details of the personnel they proposed to use and the fees that would be charged. In some instances the brief given was very detailed with a good description of the physical extent and purpose of the scheme, and the terms of

payment clearly defined. In other instances there was no basic information at all, or else one was asked to put in a submission on the basis of a 5-minute chat with the local Sheik. No idea was ever given of the time scale of the scheme, but usually it should be assumed that it should be completed yesterday.

5. The scale of fees suggested by the Association of Consulting Engineers was not applicable. The fee stated in the submission was based on how much it would cost to do the work, how keen one was to obtain it and what price competitors were likely to quote. Mr PAUL knew of cases in recent years where the lowest price always got the job. Some Arab States insisted on deducting up to 10% of all consultants' fees as retention money until the engineering duties were complete. On a very large scheme the duties could go on for a very long time beyond the maintenance period. There was also the possibility of further negotiation of the fee after selection, which might make a substantial difference to profit margins.

6. However, there was some evidence now to suggest that the lowest price was not always selected. Selection was based on price, technical capability and the quality of service likely to be provided by the consultant. In the past some Arab countries had employed what might be called "hack consultants" from other parts of the world who provided poor technical work, no service to their clients and demanded throughout the job additional fees.

7. Mr PAUL suggested that for some countries it was not wise to refuse to put in a submission when requested to do so. If they refused firms might never be asked to put in a submission again.

8. It was necessary to consider from the outset whether to establish a joint venture with a local firm and put in an offer together. In Iraq it was now compulsory to tie up with a local firm and in most other Arab countries it was preferred, and Mr PAUL thought this was likely to become the rule.

9. Consultants should appreciate the speed with which the Arab States wished to turn their schemes into reality. There was a sense of urgency attached to projects which was often sadly lacking in the U.K., and a British consultant given his first job in an Arab State would find it difficult to adapt to these needs. In order to provide an efficient service and necessary liaison with a client it was essential to have one or more engineers on the ground from the start. Clients preferred to deal with engineers from

a local office rather than to suffer the delays of engineers having to fly out from the U.K. Often there were communication problems, postal delays and difficulties with getting Telex facilities, and it was therefore necessary to ensure that the quality of engineer working overseas was good, and that he had a fair measure of autonomy so that he could make decisions without continual reference to head office. This in turn necessitated that the senior man overseas had a high level of competence and that head office had confidence in him.

10. Most public health schemes were wanted by yesterday and a client was always looking for results and not excuses. It was therefore advisable to warn clients of problems envisaged before they occurred rather than after. Above all the consultant must appreciate that the Arab States wanted service and if they did not get it from one consultant they would go to another - they were not afraid of sacking consultants.

11. Staff should be prepared to attend meetings at short notice, and spend considerable periods of the day during which they felt that little constructive work had been done.

12. Working conditions and hours of work could be rough. Very often it was a twelve-hour day, six or seven day week, with temperatures up to about 120°F with humidity in the 90's. For an engineer who had spent all his life in the U.K. the climatic conditions in most Arab States took a lot of getting used to.

13. In most cases a consultant could expect to be given additional work outside the original scope of works, so even if a consultant carried out the major design work in his head office, he should allow for having some design engineers in the local office, who could undertake the smaller jobs. Trying to plan the number of design engineers required was difficult as the situation could change dramatically from one month to another. Work permits, residents' permits and driving licences all took time to obtain and it was highly desirable in the local office to have an office manager to be responsible for getting these and for dealing with government departments on general office matters. This should preferably be a local man who knew the relevant procedures, who could speak the language and who knew all the short cuts. This could take a big work load off the engineering staff. Mr PAUL said there were a multitude of other points that could be mentioned and he hoped some of these would

be raised during the discussion. Essentially the problems revolved around a need to provide a quick and efficient service and at the same time trying to balance this with delays that could be experienced in trying to obtain information from government departments. The high level of bureaucracy necessitated multiple form-filling and multiple signatures.

14. Mr PAUL said there were problems that British consulting engineers would find in operating in Arab countries but a number of these problems were no different from those that one might expect to find in other parts of the world or in the U.K. When the incredible changes that had occurred in Arab countries were considered, the speed with which they had completed capital works programmes was amazing.

15. Mr PAUL concluded by posing some questions: were British consultants in general offering a good service to the Arab countries; were there ways in which this could be improved; and was sufficient account taken of local needs both in terms of design procedures and the type of works recommended to the Arab States? One area worth discussing was what might be termed "after-sales service".

16. Mr J.F. BATES said a few years ago Arab States used to like being given reports, and they had thousands of reports in some offices in Arab States. Nowadays if one did get a commission to work, the biggest problem was to establish the basic parameters. One needed a crystal ball in most Arab States at the moment because development was so fast.

17. In Saudi Arabia, Dubai and Bahrain planning was not a very developed science. So the public health engineer needed to do a lot of his own planning by deciding what was likely to happen in the way of development, such as where centres of population were going to grow, the type of population, the amount of industry, and the likely water consumption. These had to be established right at the beginning to produce designs that would be acceptable by the time they were completed. It was possible to complete a scheme which was overloaded from the start. It was often found after completing a design that the client suddenly decided to build a palace here or an industry there and thus the design had to be sufficiently flexible to absorb these new ideas.

18. It was important to produce a design which was simple to construct, operate and maintain. Sophistication would be wanted

later, but for a new scheme simplicity must be uppermost in the designer's mind. In the early days more sophisticated contractors were available in the Gulf for water supply and sewage treatment schemes. Nowadays the work was being carried out on lower prices by local contractors who had limited know-how, so the form of construction should not be difficult to implement. Specifications must suit local conditions; it was no good using specifications that were appropriate to work in the U.K. Most of the materials and plant had to be imported and a lot of countries had had a great deal of difficulty with concrete.

19. Cement was generally imported although there were some cement works now in production. There were always difficulties with anything that had to be imported. Sometimes there were panics and all the agents thought it would be a good idea to buy cement, so the country became flooded with cement. Mr BATES had seen great piles of cement, because there had been a shortage and there was now a surplus. It was important to ensure that one did not use the cement that had been in store for months. Sources of aggregates were very difficult in this part of the world and a great deal of care had to be taken in selection. Reinforcement had to be imported; it was no use changing designs at the last minute because it was impossible to go to the stockist and get the different types of bars wanted. A great deal of care had to be taken in the type of water used because of the chloride content.

20. Ground conditions varied along the Gulf. Most development was along the shoreline around creeks where groundwater was very high. A good soil investigation programme was essential. In some countries groundwater was only a metre below the surface so hardly anyone had gone below two or three metres. For sewage systems problems of groundwater arose that had not been considered before.

21. Supervision had to be of a very high level. More use was being made of local contractors who might be associated with international firms, but a lot of local inexperienced labour was used. Thus generally the resident engineer had a great role to play. Sophisticated form-work and materials available in Britain were expensive to obtain in the Gulf States. On a large scheme with a lot of standard work it was worthwhile to import steel forms as local carpenters used very thin wood and had to be watched carefully. Safety in construction was not given much thought in the Arab world as there was little regard to life. It was

common to find a man at the bottom of a deep trench with no support.

22. Finally Mr BATES said it was fascinating to see the amount of improvisation that was done in construction in that part of the world. If a pipe needed plugging a small garage or contractor would use a vehicle tyre to make a plug.

23. Mr G.B. RALPH asked for comments on the ethical constraints imposed by the code of conduct which British consultants were expected to observe opposed to the unbridled approach adopted by some consultants from other countries. After-sales service had been touched upon in earlier discussion during the Conference, and from the depth of feeling as to its desirability from engineers and administrators present, Mr RALPH suggested that consideration should be given to incorporating supplementary offers into submissions, quoting an additional price for a further commitment for say two or three years beyond the normal maintenance period.

24. Mr PAUL replied that as regarded ethics it was up to the individual firms to sort out their own policies on this matter. He was not in favour of bribes and did not think that in the long term it paid to give them. The CHAIRMAN felt it was known that British consultants "played it straight" for the past fifty years and more.

25. Most consultants working in these areas were very conscious of after-sales service and did alert the client to the need he had to operate a plant or system. Initially the client probably needed 100% assistance. He would probably take on a two-year operation and maintenance contract when the maintenance period started in the hope that in those two years they could train sufficient operatives to take on the plant. This was costly. The CHAIRMAN's firm were presently doing a scheme in Benghazi where a two-year operation and maintenance contract for a conventional 6 mgd treatment plant, where the contractor had taken on the total cost of operating and training, was of the order of £1½ million. This was the sort of cost that these exercises demanded, but no half measures could really succeed.

26. Mr B.M.U. BENNELL asked whether it was felt that adequate support was given by the British research institutions. He thought perhaps more could be done to help with problems such as using highly polluted water for concrete. The CHAIRMAN felt their support was recognized and used. The difficulty was possibly getting an answer a thousand miles away from the actual

laboratory. At times staff from the WRC/Stevenage were seconded to do a particular job. Mr BATES suggested that more help was available for water supply than for sewerage and sewage treatment.

27. Mr M.I. ALDRED asked about the differences between the basic design and the actual construction. Mr BATES said guesses made seven or eight years before on loadings on biological filters had come out very well. The strength of sewage varied enormously, depending on whether the state gave its water away or charged for it. Changes in basic concepts in design were required less than design for flexibility.

28. Dr S.M. ROMAYA wondered to what extent local engineers were brought into the design stages. Mr PAUL replied that this was very variable. If there was a joint venture a fair measure of the design work would probably be done in the local firm's offices; obviously local engineers would be used, supplemented by one or two people from the U.K. On other schemes all the design work was done in the U.K. Mr BATES said that his firm welcomed working with local firms and local engineers, but there was a lack of know-how and a lot of training was necessary, especially of technicians.

29. Professor S.V. PATWARDHAN asked what other countries were in competition with British consultants and had consultants tried collaborating with other developing countries, like India? Also, what testing and investigatory facilities were available in the local countries, and could equipment and suitable sand be obtained easily? Mr PAUL said consultants came from all over the world but the Americans did not seem to have moved into the Gulf area in a very big way in water and sewerage. In the Gulf it was possible to obtain quite experienced engineers from India and Pakistan. Mr BATES said testing and investigation had developed considerably in the last five years. However, very few local firms could do detailed soil testing in Saudi Arabia. Water was often tested in the U.K. The availability of small equipment such as pumps was improving all the time. It was often a problem to find sources of good concreting sand.

30. Mr P.A. OLUWANDE asked whether Mr Bates would favour oxidation ponds as he had mentioned simplicity of design. Mr BATES said oxidation ponds were simple to construct and were ideal in circumstances where there was a lot of sunlight, but he contended that they could be difficult to operate on a large scale. It was necessary to have experienced people and sophisticated control

for a population of 100 000 for instance. Perhaps biological filtration was better because it was relatively easy to operate and could take shock loads. In New Zealand ponds had become septic despite sophisticated operators with a sophisticated laboratory. In the Arab world smells were something to be very much avoided, and he had been told "no ponds" by some people.

31. The CHAIRMAN felt that in any system a level of competence was needed. Ponds required good laboratory technicians. By and large the biological filter was the simplest treatment Arab States would look to. Another aspect was that ponds were usually built some distance from houses, but before long the town had developed to surround them.

32. Mr OLUWANDE asked about re-use of sewage effluent. Mr BATES said effluent was needed for irrigation. Pathogen removal in ponds could be effective, but algae growths sometimes limited the use of the water.

33. Mr R.P. WHITING had heard that a number of consultants in European countries received help from their governments in one way or another, and that British consulting engineers were at a disadvantage because they did not get this help. The CHAIRMAN said British consultants complained about this from time to time but got no response from the Government. Some European and other overseas consultants received special tax concessions and there were specific instances of a European government giving specific aid towards a project. Mr BATES said there were government controlled consultancies in some European countries. The CHAIRMAN said this was probably a more serious problem to British consultants because it was very difficult for partnerships to compete against government agencies.

34. Mr ALDRED asked what difficulty had been experienced from clients pressing for a greater degree of sophistication in design than was considered desirable on a particular scheme. Mr BATES had not had a client who had pressed for more sophistication. Over the years British consultants had created quite a reputation and usually their advice was relied upon.

35. Mr J.C. HOWARD had the feeling that British consultants were all lone operators competing with each other. It might be useful to have someone to look down on them and give advice on where they might operate jointly with shared facilities and communication. The CHAIRMAN felt there was probably an unnecessary expenditure of effort in the securing of work by British consultants due to their individualistic outlooks

and attitudes. Mr HOWARD said management study was a salutary thing, and sometimes a fresh eye might come up with a good idea. The CHAIRMAN said consultants had employed management consultants and done some of the things they advised, but ignored 90% of some advice.

36. Professor M. DANBY asked to what extent consultants used university facilities in the U.K. and locally. The CHAIRMAN replied that on the water side his firm had used them from time to time overseas. On the sewerage side they had not used much university facility, but tended to go to Stevenage.

37. Professor DANBY had worked at a local university in an Arab State and often British consultants went to that country and seemed totally unaware of the University. There was a fair amount of research work done at that University which could have been extremely useful to them. He wondered if the laboratory facilities of the engineering college at Riyadh had been used. This could be useful to the consultants and the consultants themselves would help the educational process locally if they were involved in an interesting project, by talking to the students. There had been lack of fruitful contact in countries he had been concerned with.

38. The CHAIRMAN thought there was a lack of local technical use by consultants in some overseas projects. Generally consultants were so busy getting the project brought into operation that they did not have the time or facilities to be dabbling in the educational aspects that arose from the project. Dr ROMAYA felt that a little effort and expense could generate a lot of goodwill.

39. Mr M. LANSDELL said recently he had visited an American-designed sewage works in Trinidad where the annual temperature ranged between about 28 and 32°. He was surprised to find at these works two heated digestors, with walls about two feet thick, gas collection and the remains of a boiler. All this had been abandoned and comminuters had been replaced by a man with a screen and a rake. Mr LANSDELL wondered to what extent our consultants were guilty of fetching out drawings from the U.K. and using them without considering the local capabilities of the staff who had to maintain these works. The CHAIRMAN felt British consultants were capable of treating each job as an individual job and giving full forethought to the design study required. British consultants in the main were not in and out of an area; they

remained for ten to fifteen years, and had an on-going concern which meant that once they finished a job they had to make sure that it worked.

40. Mr BENNELL asked whether consultants felt they were under any threat from the manufacturers offering package deals for the installation of sewage and water treatment plants. He suspected the instance quoted by Mr Lansdell may have been put in by an enthusiastic manufacturer from the States without a consultant's advice. The CHAIRMAN did not feel there was any threat. If the client wanted to try the package plant, the consultant would give advice as to how he should draw up his terms of reference and the tendering procedure for the package plant. An alternative was for consultants to make their design expertise available to the manufacturer to give him a full awareness of what was required.

41. Mr BENNELL said the situation he envisaged was a plant manufacturer offering the package to the Sheikh without any consultant being involved. The CHAIRMAN said nothing could be done about this, but he did not think there was an increase of this practice. Mr BATES thought a lot of Arabs had had their fingers burnt on this and were now more cautious.

42. Mr R.G. DEFRIEZ asked whether the 10% retention of consultants' fees was over and above the contractors' retention. Mr PAUL replied that it was.

43. Mr DEFRIEZ asked whether there was usually any difficulty in getting payments. The CHAIRMAN replied that it took anything from three months to three years. It was difficult to obtain prompt payment, but this generally was tied up with the client's heavy administrative load. In North Africa consultants had to provide something like a 5% bond which could be quite a large sum of money. Consultants were concerned that the British Government did not recognize this as needing a special arrangement of government aided insurance cover.

44. Mr PAUL showed some slides of construction works in Saudi Arabia and Baghdad. The CHAIRMAN thanked Mr Bates and Mr Paul for their introductions and for taking part in the discussion.