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CONSTRUCTOR

THE MANAGEMENT MAGAZINE OF THE CONSTRUCTION INDUSTRY

Volume XLVII Number 1

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COVER: AGC President W. Roy Rogers, looking like Mr. General Contractor in person, poses before "The Domain of AGC." (See profile of Mr. Rogers on page 28.)

PLAINTIFF'S
EXHIBIT
B&R-171

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Cover: "Generals' Headquarters" might well be the title for our cover picture, which shows a close-up of the entrance to the National Headquarters Building of the Associated General Contractors of America, Washington, D.C. The name over the entrance is a recent addition and is being shown in the CONSTRUCTOR for the first time.

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Cover: Norman Rockwell's painting, commissioned by Mr. J. C. Hall of Hallmark Cards, Inc. to symbolize the spirit of Kansas City when that metropolis was rebuilding following a severe flood, symbolizes also the spirit of the construction industry and the spirit of AGC's Plan Bulldozer. (See page 16.)

CONSTRUCTOR

THE MANAGEMENT MAGAZINE OF THE CONSTRUCTION INDUSTRY

Volume XLVII No. 4

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Cover: Ira H. Hardin, Atlanta, Georgia building contractor, is the 46th President of the Associated General Contractors of America. A profile of his background and some of his thoughts as he assumes his new office begin on page 30.

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THE MANAGEMENT MAGAZINE OF THE CONSTRUCTION INDUSTRY

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Cover: Atlanta's "new look" is evident in many ways, but none more dramatically than in the field of construction. Our cover scene conveys this story very graphically as the new buildings, highways, and in the foreground, the new Atlanta Stadium will testify. For the interesting story of how this stadium was completed within a year, ahead of schedule, plus a word-and-picture report on Houston's fabulous new Astrodome, the stadium of the future, turn to pages 12 and 13.

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Cover: *Our cover photo this month is an aerial photograph of the Washington Cathedral, a magnificent Gothic structure which has been under construction for 58 years and still has 20 years to go before completion. Beginning on page 26 is the story of this remarkable edifice.*

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Cover: Our cover this month is taken from the new AGC film, "The General With the Cockeyed Id." The "General" is M. Clare Miller, general contractor from McPherson, Kans., and past president of AGC. For the full story, turn to page 60.

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Cover: Our cover this month shows a display map of the Interstate Highway System, which was brought up to the minute by the Bureau of Public Roads for the National Highway Conference held in Washington, D. C., last month and sponsored by the AGC. For details, turn to page 28.

CONSTRUCTOR

THE MANAGEMENT MAGAZINE OF THE CONSTRUCTION INDUSTRY

Volume XLVII — No. 9

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Cover: Sixty-ton ribs probe skyward in St. Louis' Busch Memorial Stadium now under construction; 125 feet in the air, the five cantilevered girders in our photo are waiting for their precast roof topping. At far left, a freshly-poured rib hardens in its orange-red fiberglass form. Complete story on this new St. Louis landmark begins on page 13.

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CONSTRUCTOR

THE MANAGEMENT MAGAZINE OF THE CONSTRUCTION INDUSTRY

Volume XLVII No 10

OUR COVER

Rear Admiral Peter Corradi, Chief of the Navy's Bureau of Yards and Docks, is featured on our cover this month. The tremendous job he has done and the type of leader he has been are detailed in a complete article starting on page 28. He will retire November 1.

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CONSTRUCTOR

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OUR COVER: *Gracing our cover this month is the headquarters building for the Pan American Health Organization and the regional office of the World Health Organization. Located in the Foggy Bottom section of Washington, D.C., this unusual building is attracting a large measure of notice and comment. Our story begins on page 26.*

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CONSTRUCTOR

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COVER: Featured on our cover this month is the "topping out" of the fabulous Gateway Memorial Arch at St. Louis, erected by MacDonald Construction Co. This picture and most of those appearing with Booth Mooney's article, which starts on page 20, were taken by Arteago Photos of St. Louis, which features the arch on its insignia. Our thanks to Arteago for some wonderful photographs of a great construction feat.

CONSTRUCTOR

THE MANAGEMENT MAGAZINE OF THE CONSTRUCTION INDUSTRY

MARCH 1965





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(Reader Service No. 740)

Dust Control Makes Sense; Saves Dollars



Guess what's missing from this highway project. Dust! A good application of calcium chloride has not only eliminated the dust, but also the complaints from motorists, roadside residents and businesses.

IN THE OLD shoot-em-up westerns, the dust cloud on the horizon usually meant that the cavalry was riding hard for the rescue. But today's motorist could care less about the cavalry; when he spots a dust cloud on the horizon he generally clenches his teeth, rolls up the car windows and mutters to himself about the blasted construction people always re-routing him over some detour that would turn an old desert rat brown with dust and envy.

Elimination of dust around highway projects, or for that matter, any construction projects, is a two-part consideration: one part makes sense, the other part saves dollars.

From a public consideration standpoint, the elimination of dust is also the elimination of complaints from motorists, homeowners, merchants, in fact anyone who comes in contact with your project. Workers too, appreciate a dust-free job.

As far as dollars are concerned, dust is your enemy. It can cause accidents, frequent breakdowns, make your machinery and tools wear faster and actually slow your job down. One study has shown that on a dust-laden job a road scraper averages approximately 8.3 miles per hour producing about 40 cubic yards per hour; but on a good haulage road the same scraper can travel an average of 14 miles per hour and haul about 62 cubic yards per hour—an efficiency increase of almost 55 per cent!

One method of dust control over the years has been the application of calcium chloride. You can use it along shoulders during resurfacing, on newly-placed base courses, and on cross-overs and short run-arounds. It can also be used on detours, temporary routes, haul roads or on any place where vehicle travel raises the dust problem. Sometimes, calcium chloride is mixed with new aggregate to beef up a temporary road, costing less than paving.

Applied either dry or wet (depending upon the moisture condition of the surface to be treated), calcium chloride is easily handled and one application usually lasts until a job is completed. In many construction contracts, calcium chloride is a bid item for which the contractor is reimbursed.

Information on the many uses and correct methods of calcium chloride application can be obtained by contacting the Calcium Chloride Institute, Dept. C, 18th and M Sts., N.W., Washington, D.C. 20036. They'd like to take the dust out of your (h)air.

The Worsening Conflict

Contractors Versus Engineers

by C. P. DUNN
Consulting Engineer
Seattle, Washington

THE LINES of communication between contractors and engineers have broken down to the point where a smooth running job is a rare event, and the usual situation is mutual distrust and misunderstanding. There is a very definite unnecessary conflict of interest, which adds to costs.

The increasing strain in relations is now causing many millions of dollars of unnecessary costs every year, around 15% in additional costs which do not represent any increase of quantity or quality of product. This is a net waste, to be absorbed by the ultimate consumer of the services.

The above obviously applies in greatly varying degree to different persons and to different contract documents and contract administration as put out by different agencies. The standard U. S. Federal Government form of contract which we used to think was pretty tough now looks pretty good when compared to some of those which are being offered by other agencies. It at least implies that the engineer, being in control, has an obligation to be an impartial administrator, and to a substantial extent it works out that way, depending on the nature of the contracting officer. Current difficulties are principally caused by agencies other than the Federal Government.

Under present circumstances, the spirit of cooperative effort is being destroyed, and the contractor, forced to spend far too much of his time and effort on petty controversy, seems to accept the continual battle as a "way of life."

Trend is Snowballing

This thing is now snowballing rapidly. When somebody "gets away with" an improper document and receives a bid, the next document to be offered will be still worse. How would you like to be saddled with responsibility for the time penalty of another contractor over whom you had no control? How would you like to have a bond written so that the owner could get money on demand from the bonding company without consulting the contractor? These things have been proposed.

The writer has recently seen the sorry spectacle of competent contractors who are eager for work sadly "walking away" from an attractive job without submitting a bid, the reason being that the proposed contract document put more burden of risk on the contractor than it was possible for him to hope to carry without proper compensation and stay in business. When that happens, the situation surely requires attention.

The writer feels that it is the duty of those who know of this situation to "speak out," and act accordingly. It is a duty which goes with traditional professional ethics and integrity. Some engineers writing new contract documents might well ask themselves, "What has become of the good old fashioned idea of being honest with ourselves?"

The writer believes that he has a right to speak up, because he has a background of more than fifty years exposure to the problems of relations between engineers and contractors and owners, and he is now doing so with the hope that what he has to say will in some measure be constructive help in what has come to be a very serious situation. He has the perspective of seeing changes take place: changes for the worse, coming too fast now.

The situation will not cure itself, it will get worse as long as it is accepted without vigorous protest and action.

Why It Has Happened

To figure out "what to do about it" we need to find the causes of the trouble and know what we are dealing with. There are several things that cause trouble, among them the engineer's fear of legal difficulties and his fear due to lack of confidence in himself, and an attitude of mutual distrust between the engineer and the contractor. Also, there is the owner's lack of understanding of his own problems, and organized labor's desire to take a larger part in managing construction than is their just due.

The engineer fears that somewhere along the line, maybe in negotiations, or maybe in the contractor's failure to keep promises, the contractor might outwit him. A large part of

his fear comes about because most engineering organizations are frightened of legal responsibility for mistakes they might make, mistakes in judgment mostly. Actually, they are seeing these things in much exaggerated perspective, but it is true that some degree of risk of this type exists.

Giving the Contractor the Risk

It is common practice for the engineer to write the specification and contract in a way to put the burden of risk on the contractor to the greatest extent possible. The engineer is an employee of the owner, so he is reluctant to put the risk on the owner rather than the contractor. The result of this is that the contractor is asked to become in effect an insurance company, and is sometimes asked to take risks which a regular insurance company would refuse to take.

Contractors are willing to take risks in reasonable amount, and have long been accustomed to doing so, but they cannot accept some of the astounding terms that are now being offered. Terms read like they were a deliberate attempt to destroy the contractor, but it is more likely that there is just no thought behind them.

The cure for this risk business is for the owner to step up and accept the risks which rightly go with ownership, and quit telling the engineer to load it all on the contractor, and the owner should relieve the engineer of his worry about being sued. Basically it is not possible, by clever words on paper or any other way, to evade certain risks which are inseparable from ownership. It is not practical to expect the engineer to take financial risk far beyond his experience and competence.

If he is competent and sincere and does his job to the best of his ability, and has people on his staff who know construction procedure, he need not have a fear of being destroyed by a court action.

The owner of a large project should expect to take care of his project and the unexpected things that happen to it, both during and after construction. He should be prepared with competent personnel, and with money. He should give the engineer authority to settle matters of adjustment with the contractor currently, when they occur, and should require him to do so.

Putting off Claims

On too many jobs it is becoming a habit to put off the "claims," even the little ones, to "arbitration" at some indefinite time in the future. Simple matters of common everyday business are subject to inexcusable delay. This is a cause of constant irritation and added cost to the contractor. It seems nobody wants to be responsible for paying money to a contractor; it is considered to be a weakness to do so.

During the past few years there has developed a new concept in regard to financing and building publicly owned projects. Some "Public Utility Districts" and "Municipal Utility Districts" and the like have been arranging financing by selling bonds which are based on an engineer's estimate of the cost of the project and on the revenue to be obtained by operating the project.

Quite often there is a ceiling on the amount of bonds which can be issued against the project and the contractor is required to agree to complete the entire project, regardless of unforeseen adverse conditions, for a fixed total sum of money. When the adverse conditions occur, the owner presses the engineer to exert pressure on the contractor to complete a high quality project regardless of cost, "come hell or high water," and hell and high water usually come.

In this sort of situation the owner is at fault. Criticism of him should be tempered with sympathy because many times he is inexperienced and simply does not know of the magnitude of the financial hazard he is asking the contractor to assume when he asks him to guarantee a total lump sum price for a finished project regardless of overrun in quantities and costs which may come about due to unforeseeable conditions.

But, if the owner knows better, and still handles his affairs on the basis of asking the contractor to absorb all the risk, he is guilty of being unfair and impractical.

Problem of Mutual Distrust

The attitude of mutual distrust is of long standing and becomes worse each year.

The engineer and the contractor too often both overlook the fact that two distinctly different types of skill are required to accomplish a heavy construction project. On the engineer's part there is serious responsibility for safe design and for proper examination of foundations and other conditions to the point where the characteristics become known, and for proper and reasonable in-

The Author—No Stranger to Controversy

C. P. Dunn has never hesitated to speak out on subjects of vital concern to the construction industry, no matter how controversial. He is well qualified to write on the relationships between contractors and engineers, because in his long career he has served on both sides of the fence. He was superintendent of construction for Madden Dam, Panama Canal Zone and construction engineer on piers for the San Francisco-Oakland Bay Bridge. He has held many positions with Morrison-Knudsen Co., most notably presidency of International Engineering, M-K's design subsidiary. He was a Beaver winner in 1959.



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spection of the contractor's work. On the contractor's part there is the concern with planning and management, and leadership of men, and costs, and time and money.

The cure for mutual distrust is for engineers and contractors to get together in frank discussion. If and when that happens, the atmosphere will change to that of mutual respect and confidence. They both need to realize that both are indispensable to the accomplishment of a big job; that many good engineers could not hold a job on a contractor's staff, and many good contractors could not hold a job on a design staff.

This very much needed discussion must be brought about by engineers making the first move, because the engineer is now in control of the situation, and the contractor has taken just about all the beating he can absorb. He is willing to talk, but is not about to beg for the initiation of talks.

Who Protects the Contractor?

Almost every contract contains provision for the engineer's decision on controversial matters to be "final and binding." Up to a point this is all right, because somebody has to be the boss. However, most engineers completely lose sight of the implied or expressed contract obligation that surpreme authority carries with it the need for impartial administration, and the moral obligation to be reasonable.

Nearly all engineers take the position that their duty is to protect the interests of the owner against the contractor. I have not yet seen an answer to the question, "Who protects the contractor?"

This alignment, one side against the other, is completely foreign to the idea of impartial control by an organization with complete authority, and is completely foreign to the basic principle that a contract should be an agreement establishing cooperative effort to accomplish a useful structure at a reasonable cost. The engineer and the contractor can neither one of them produce if there is a situation of conflicting interest. They must both be going in the same direction to get anywhere.

Where the Contractor Has Been at Fault

1. The contractors can be blamed for allowing this situation to deterior-

ate year after year without more active attempts to cure it. They are equally guilty, along with the engineers, for the breakdown of communications.

2. The contractor too many times bets that the weaknesses in a document will create an opportunity for claims.

3. Contractors are at fault when they bid with the knowledge that their price is so low that the only possible "out" is additional money collected through claims and suits.

4. At times contractors are at fault in presenting unreasonable and unsupportable claims.

Where the Engineer and the Owner Have Been at Fault

1. There seems to be at the present time a contest to see who can come the nearest to writing a "claim proof" contract document, an attempt to write words that will prevent the contractor from collecting money, without considering the possibility that he might have money coming. The document writers seem to have no concern about total costs being increased or whether the money comes out of the contractor's pocket or the ultimate consumer's.

2. Engineers and contractors and owners are all three too keenly interested in asking, "What is best for me" and "What do I get out of it?" to the exclusion of "What can I contribute to make things run smoothly?"

3. In such a confused atmosphere, it is sometimes possible, on a "one shot" job, for the owner-engineer to pass substantial portions of cost (which are rightfully owner's cost) to the contractor, in a way that may cause the owner to feel that he has driven a good hard bargain and has got his work done at low cost (to the owner), but, if he has unfairly increased the contractor's costs to the point of injuring the contractor financially, the result will be reflected in future bids. The "one shot" owner does not care, but others care or should care. Most of this added cost is waste.

4. Many times the owner is at fault in not giving the engineer enough time and money for preliminary exploration and study. The engineer wants the job to go ahead, therefore he is more optimistic than circumstances justify. This situation, with things not thought out sufficiently in advance, results in the necessity for changes during the job.

The changes are necessary, but they cost money, and too many times the document is written so that it is the contractor's money. It would help to more often make provision in the contract document for simple and convenient procedure in arranging changes, and in paying for them, and the intent to pay for them should be clearly stated.

5. Many contracts contain provisions for heavy and unnecessary time penalties to be assessed against the contractor. He should be penalized only for those events which are under his control and not for things which he has no chance to influence. He should not be made responsible for foundation conditions, or for any features of design, and certainly not for the shortcomings of some other contractor.

6. There is a long standing custom that the owner shall hold back a certain percentage of the contractor's money as a guarantee that the work will be completed properly. This is a custom which is quite generally accepted as being right. It is now developing that this proper procedure is being abused. Sums are retained which are far greater than is justified and for longer periods than justified.

This practice is sometimes coupled with a one-year guarantee of machinery. The machinery manufacturer is entirely willing to guarantee his product against defects for a year or more, but he is sometimes unpleasantly surprised to find that during the guarantee period the owner takes over and operates with a somewhat inexperienced crew, and on minor excuses holds a large sum in "retained percentage" and keeps the contractor on the job with a substantial crew doing housekeeping and minor maintenance chores, things that are normally a part of operating cost.

7. The design engineer is chronically late with his delivery of drawings to the contractor, which shortens the time available for efficient construction planning and purchasing. There is an old saying: "More things would get done on time if they were started sooner."

8. Inspection is a very important and necessary procedure, and it involves large sums of money—the contractor's money. Far too often it is handled by inexperienced personnel.

9. It is wrong to ask a contractor in a bid invitation, to list the equipment and personnel which he has available for the job. If his business is a live, going concern, he just cannot tie up specific men and equipment during the period while a bid is under consideration.

It is wrong to ask him to have firm commitments with subcontractors in advance.

10. At present, we seem to have an epidemic of the so-called "Critical Path Method" of scheduling work, and studies of this type are often required in connection with a bid. The writer has seen $20,000 wasted on this item on one job. If a contractor is of the stature to be allowed to bid, he can plan his work. Let him do it in his own way.

What Is a Construction Contract?

It seems to be in order to describe what is being discussed when we say "construction contract." There is an old time-worn legal saying that it is a "meeting of the minds." That is not a correct description of a modern construction contract. The minds do not meet. The day they sign the contractor and owner shake hands, but are warily eyeing each other and each is thinking "I wonder if this fellow has something up his sleeve?"

A construction contract comes about as follows:

An owner hires an engineer. He might, and often does, choose the one who is the most agreeable and most optimistic about the project. The engineer is human, and is in some measure influenced by a desire to see the project proceed; that makes work for engineers. Many times he lacks the courage to call attention to potential difficulties

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The inequities and ills cited by Mr. Dunn have been of major concern to the Joint Cooperative Committee of the American Society of Civil Engineers and Associated General Contractors. These were taken into consideration during revision of the jointly-sponsored Form of Contract for engineering construction which has been two and a half years in the making. The Joint Committee met this past summer and discussed many of the topics cited by Mr. Dunn. Copies of the Committee's report are available on request to the National AGC Office.

which he sees, and many times he fails to foresee construction difficulties, and he too often lacks the courage to demand enough time and money to properly cover preliminary investigation.

The owner desires to buy something; he wants to bring about the accomplishment of a project or a portion of a project. His engineer describes, to the best of his ability, what is wanted in the way of characteristics and quality of the finished product, and states the time available for the accomplishment of the work, and he tells what he knows about the circumstances (foundations and other things) which will influence the rate of progress and the cost of the work (quite often denying responsibility for the accuracy of what he says).

Many contract difficulties originate with an owner's failure to clearly state what he wants.

Then, ordinarily, competitive bids are invited.

Contractors figure to the best of their ability what the cost of the project will be, taking into account their own inability to forecast future events precisely, but relying on the owner's description of what he wants to buy, and on his description of the surrounding circumstances which will influence the operation. (Some of these circumstances may be under control of the owner.)

Readiness to Serve

In response to the invitation to bid, one of the things a contractor has to offer is "readiness to serve," that is, being in business and owning equipment and paying the cost of maintaining the core of an organization during slack periods.

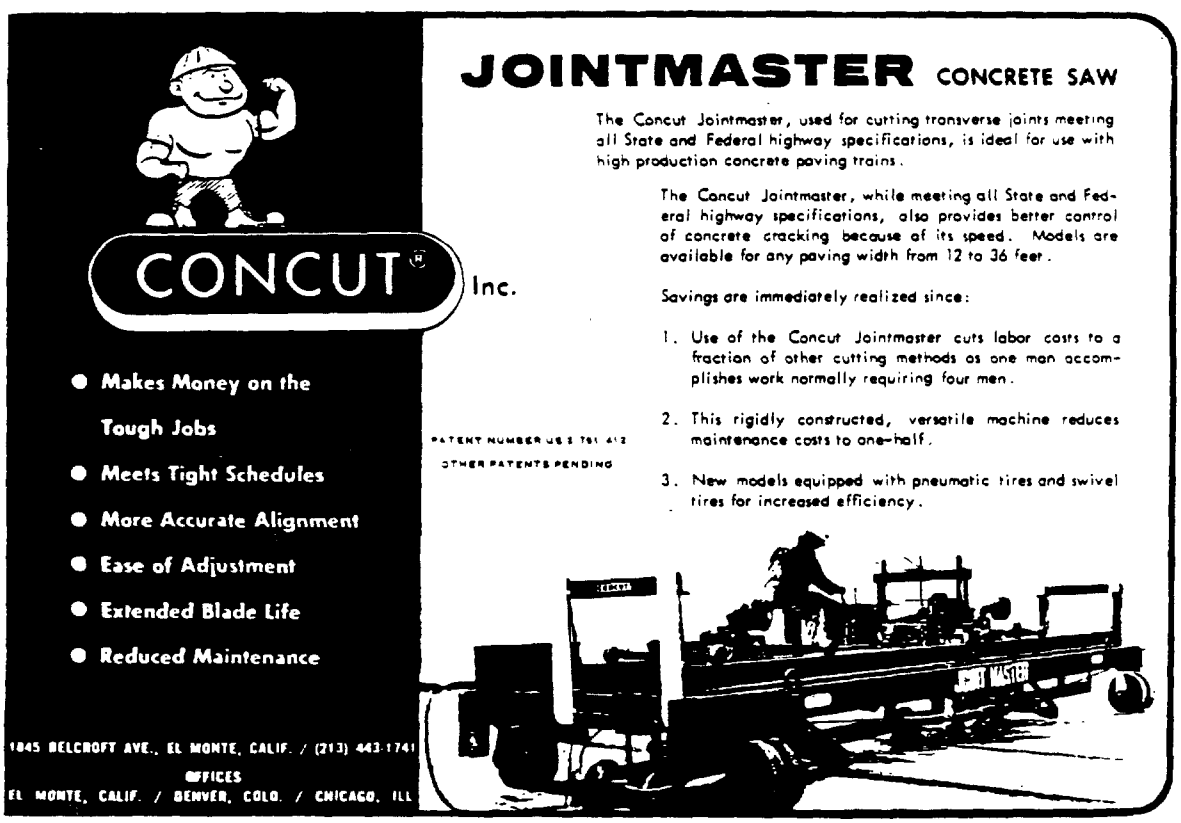
Principally what the contractor has to offer is professional skill, the skill which comes from experience in planning work in detail and procuring and shipping equipment and materials, the skill which comes from an experienced group of employees working together as a team; the skill which comes from experienced knowledge of what can be reasonably expected in the way of productivity of the labor force, the skill which comes from experience in conducting proper relations with labor unions, and from experience in managing (and when necessary disciplining) skilled labor.

After the receipt of bids and the award to the low bidder, a contract document is prepared, defining the agreement between the parties. Such agreements are usually "one-sided," with the purchaser in complete control, but they really depend for success on the depth of the understanding and good faith which exists.

Contract a Purchase Agreement

A literal interpretation of words in a document, with insufficient frank communication between the parties, results in antagonisms and quarrels and confusion and high cost, which is bad for all concerned. The desirable situation is that there be mutual confidence and respect.

A construction contract is essentially a purchase agreement. The owner wants to buy the contractor's skilled services (professional services), and the contractor names a



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price. Some people regard it as a purchasing function too literally and the affairs pertaining to the detail of the agreement get into the hands of a "purchasing agent" or "director of procurement." Because money is involved, the engineers and the lawyers and the construction men are shoved off to one side, and the important arrangement is sometimes made by people who are not qualified to measure the value of the professional services of engineers and contractors. The services are too many times valued by price and sales talk only.

When a document is written by someone who is not completely familiar with construction operations, it is likely to contain many clauses objectionable to both parties. For example, it is often implied that the engineer, who is put in complete control, is the only party to the contract who is capable of being fair and reasonable, and that the contractor is a rascal who must be constantly watched and controlled.

This, in a bid invitation, is a bad start toward good relations. A most important ingredient in any contract is mutual confidence and respect. The organization which writes and issues a document should carry the burden of anything unfair to the other party which it might contain.

Many contracts either imply or definitely state that the engineer shall be the impartial administrator and that his decision shall be final. The way it usually works out is that he is the representative of the owner and is protecting the interests of the owner. Everybody seems to lose sight of cooperation toward doing a job at low cost, with integrity.

Assigning the Blame

This article is directed mostly toward engineers because they seem to be in the best position to do something about it, but the situation will not be cleared up until there is concerted action from several other directions.

(a) The contractors are partly to blame. Most contractors are now seriously concerned about the situation, but there are still a few who are dumb enough to sign a document which should not be signed. They sincerely try to do a job at a price which is too low to cover the hazards which are unfairly imposed on them, hoping that they can wangle their way out somehow. When a contractor in this type of trouble fails to make it, there always seems to be another one who wants to take his place.

(b) The bond people are also partly to blame. They need to be a little more particular and more insistent on a sound clean contract document before they approve a bond.

(c) And finally, the owners who hire the dumb engineers who hire the dumb contractors need to examine their own performance. During the past few years there has come into being a new type of "owner," the group of men who are in control of "Authorities," "Districts" and other semi-governmental bodies. These men come from many sources. Some are successful competent businesmen, some are successful

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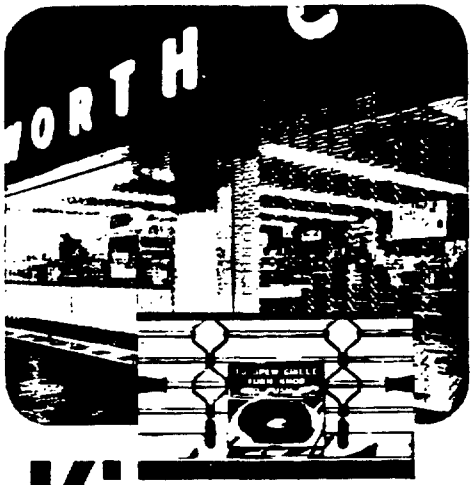


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politically, some are lawyers commanding respect, some are successful farmers, but practically all of them are without substantial experience in construction operations, and yet they are in position to call the shots.

All of them sincerely want to do a creditable job. They will do well to do some soul searching and correct their thoughts on contract documents.

If they do not improve, there is danger that they will go a long way toward putting the efficient construction organizations out of business, and that will hurt everybody, including themselves. We must not allow it to happen.

What Must Be Done?

Any human activity is imperfect and is susceptible of improvement. It will be necessary to eliminate the all too common acceptance of the idea that conflict of interest is necessary. The destructive friction between contractor and engineer must be eliminated.

With some engineers, the indifference to what happens to the contractor stems from the belief that maybe the contractor is not a necessary part of the scheme of things, and they seem to think that if the contractor were not around they would get along just fine, by hiring some men and setting up their own construction organization. Attempts to do work that way, with unorganized untrained crews, end in disaster for which the taxpayer pays; it just cannot be worked out that way.

In this situation, good results could be obtained if some competent owner-engineer combination would step up and say to the contractors:

"Here is a contract document that is right. It announces the owner's intent to buy high quality service and pay for what he gets, no more and no less. It is necessary that we be in command. We propose to refrain from taking advantage of the contractor and we propose to see that he does not take advantage of us, and we feel that we are competent to bring about such an equitable procedure. In return for this step toward an improved construction atmosphere, we expect some good bids from good contractors on this job."