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***"Selected Essays on Using
Partnering to Improve Performance"***

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SELECTED ESSAYS ON USING PARTNERING TO IMPROVE PERFORMANCE

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Chapter 14

Using the Partnering System to Improve Performance

Once the charter is written, the charter monitoring system is in place, and the issue resolution process is approved and published, we have put most of the basic tools in place ready to use. As in any results-oriented program the true test of the preparation work is how well it works when real men and women use the system to guide their actions in removing the obstacles to excellent performance.

"The test of a man's or woman's breeding is how they behave in a quarrel"

G. B. Shaw

Always to be remembered is that partnering system components are built of words that should be easily convertible to actions. They should require a minimum of questions as to their intent and meaning within the system.

Evaluating performance of the project staff by measuring perceived or actual work results against charter provision expectations is much like monitoring project progress against a critical path model of the work. A recommended system of charter performance measurement is described in detail in Chapter Twelve, Sections B and C. This regular evaluation system is generally accepted as an excellent communication tool for the total project team. Less well known is the potential contribution of accurate measurement to improved execution of work in the project stakeholder organizations.

The key to effective use of performance measurement is knowing what to do with

the findings. Monitoring is a diagnostic tool, and is not an end in itself. Performance measurement is a management-by-exception (MX) process that sounds an alarm to the manager when problems have appeared or are about to appear.¹ The alarms are silent when there are no problems. An MX system helps identify a problem as an exception; it permits the effective manager to manage the exception while leaving the smoothly running operations to continue without management meddling.

Good management of planning, design, and construction depends upon knowing what it is that needs managing. Perceiving and isolating job problems is often very complex and requires application of talent, experience, training, and education. In some projects, particularly where complex interactions between people, equipment, and materials exist, a sensing, or instinct of what is wrong is often of immense supplemental help, particularly if it comes from the mature manager.

Management tools commonly used in planning, design, and construction, such as charters, schedules, models and the like should be considered support elements to help an individual better use his or her brains, experience, intelligence, and training.

Partnering is proving to be an excellent technique to help locate and solve both project and organizational problems. One reason is that the large number of problem statements that have been identified in charter workshops indicates that a what-to-do approach to project problems will be needed almost as soon as the project is put into work. In this chapter I have delineated several case studies that illustrate the problem identification and resolution features of partnering as they may be used improve individual and organizational performance. The improvement may help correct a deficiency in the project's management; it might assist to resolve a current or potential threat to the project's health, be used to sustain and improve project execution, or it may be a catalyst that encourages raising

¹ A measuring and monitoring system that sounds an alarm to the manager when problems have appeared or are about to appear and remains silent when there are no problems.

the stakeholder organization's potential for good work.

Below are listed some of the most often-mentioned causes of problems encountered on design and construction programs. They offer a rich source of material from which to simulate problems and solutions for difficulties that have actually been met in the field and in the office.

Some problem statements were found to be answers to the question "What is it that others do that cause you problems?" and others were answers to "What is it that you do that causes problems for others?" Note that these are the major subjects addressed in the Olanta charter workshops one and two described in Chapter Eleven, Section C . Whether they are caused by others or by us is immaterial to this discussion. They occur--and they cause trouble.

To prepare the material below 2,855 specific problem statements from twenty-three charter meetings were tabulated and coded. The eight most frequently mentioned problem categories were used to build the subject discussion. Figure 14.01 shows a histogram of the frequency of total mentions of the eight problem types. One or more of the problem statements is illustrated in each case study. Case studies have been specially written to demonstrate how the problem, its identification, and the partnering system might be used to improve individual and organizational performance.

A sampling² of specific problems mentioned in each category is provided under each of the eight categories to impart to you an overall flavor of the problem category. The number of times the problem category appears in the master list is given both as a number of appearances and as a percent of the 2,855 problem descriptions.

² Problem statements have been taken from actual partnering documents. Some have been paraphrased to clarify their meaning.

Problem Types

- JMA - Job management - 1146 mentions
- CWO - Communicating with others - 984 mentions
- SMA - Staff morale & attitudes - 684 mentions
- PQP - Personnel quality & problems - 593 mentions
- ONN - Being a good on-site neighbor - 475 mentions
- TAC - Timely action - 467 mentions
- PAS - Planning and scheduling - 396 mentions
- OAR - Organization, authority & responsibility - 371 mentions

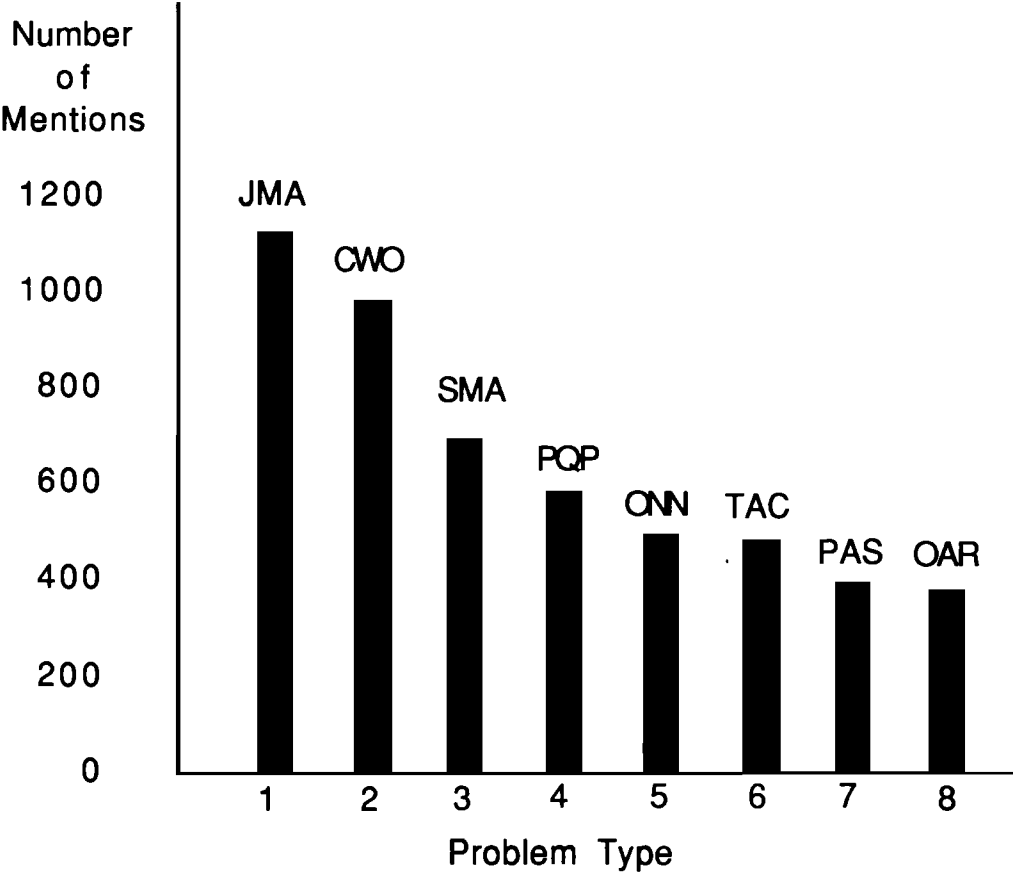


Figure 14.01
8 most frequently
mentioned design &
construction problems
from total of 2,855.

Problem #1 - Job management - appears 1,146 times - 40% of total

Sample Problem Statements

- Passing the buck.
- Requiring unreasonable manpower assignments.
- Failing to meet project deadlines.
- Inadequately supervising subcontractors.
- Preparing and issuing unrealistic schedules.
- Not providing survey control lines.
- Not providing adequate material storage space.
- Contractors failing to clean up site at the end of a project.
- Asking owner staff to cover for omissions in project documents.
- Using tunnel vision approach to project - failing to realize that others are involved or impacted besides our group.
- Prime contractor not paying subcontractors and suppliers promptly.
- Poor site management.
- Failing to resolve conflicts with other subcontractors.
- Unrealistic owner scheduling of utility tie ins and outages.
- Dictating how to do the work rather than what is to be done.

Problem #2 - Communicating with others - appears 984 times - 35% of total

Sample Problem Statements

- Given too short a notice for project meetings and equipment demonstrations.
- Avoiding the agreed-upon chain of authority and responsibility.
- Slow turnaround by subcontractors on quotes.

- Making schedule and specification changes without informing other participants.
- Not following agreed-upon project communication channels.
- Not providing sufficient notification of material deliveries.
- Not bringing problems to the proper and responsible persons.
- Lack of timely information flow to consultant.
- Multiple sources of owner direction.
- Failure to respond to warranty obligations.³
- Failure to notify those affected of utility outages.
- Not identifying who is responsible for abatement in existing facility.

Problem #3 - Staff morale and attitudes - appears 684 times - 24% of total

Sample Problem Statements

- Lack of respect for other partner's space, materials and work in place.
- Carrying over previous personality conflicts.
- People missing job meetings.
- Criticism of design without suggested alternatives.
- Improper passing of general conditions responsibility to subcontractors.
- Slow punch list and deficiency correction.
- Being available.
- Lack of design details and direction from architect/engineer.
- Proper resolution of punch lists.
- Perfunctory treatment of critical path plan and schedule.
- Indifference to need for decisions.
- Slow on closing out job.

³ A warranty is a legally enforceable assurance of the duration of satisfactory performance or quality of a product, a piece of equipment, or of work performed. Often the warranty period begins when the installation is turned over to the owner.

- Not returning phone calls in a timely manner.

Problem #4 - Personnel quality and problems - appears 593 times - 21% of total

Sample Problem Statements

- People who attempt to take advantage of or intimidate others.
- Contractor personnel not checking shop drawings.
- Contractor personnel not familiar with contract documents.
- Letting designer and owner decisions slip at the expense of estimate or construction time.
- Failing to follow up on what was agreed to.
- Failing to recognize the urgency of the problem.
- Failing to understand trade contractor's details.
- Preparing proper shop drawing detailing.
- Preparing inaccurate estimates.
- Making incomplete responses.
- Preparing incomplete submittals and providing them late.
- Lack of understanding of other disciplines' requirements.
- Preparing and submitting poor shop drawings.
- Slow shop drawings and submittal preparation.
- Summer help doing testing.
- Team members failing to prepare for meetings.
- Not verifying that existing utilities are shut down.
- Weak and late code research.

Problem #5 - Being a good on-site neighbor - appears 475 times - 17% of total

Sample Problem Statements

- Bad housekeeping.
- Breakage by others.
- Poor clean up of own materials.
- Dumpsters not on site.
- Construction noise in early morning affecting neighbors.
- Damaging installed products and materials.
- Damaging other contractors' work without notifying them.
- Electrical contractor not providing advance notice of outages.
- Placing equipment in others' way.
- Contractors failing to recognize the impact of construction work on public.
- Failure to protect completed work.
- Design team members being inaccessible or unavailable.
- Exhibiting an "It's not my job" attitude.
- Lack of respect for owner's property.
- Storing materials in others' ways.
- Poor consideration of priorities of other disciplines.
- Not attending meetings.
- Running up walls without notifying other contractors.
- Taking up more space than required.
- Using too much room on site.
- Desire to get "our stuff" in tight spaces first.

Problem #6 - Timely action - appears 467 times - 16% of total

Sample Problem Statements

- Providing late answer to questions.

- Issuing change orders too late - after work has started.
- Delaying start date.
- Delaying work.
- Fail to get submittals in on time.
- Incomplete and late submittals of estimates.
- Getting late information responses from other trades.
- Getting late information responses from consultants.
- Delays to laboratory's preparing and transmitting reports.
- Late notification of required inspections.
- Owner late in providing equipment information and equipment.
- Not allowing enough time for other team members to react.
- Not identifying and discussing problems early.
- Not on time at job site.
- Not sharing information in a timely fashion.
- Too short notice on scheduling of subcontractors on job.
- Slow paper work response time
- Slow response and processing of change orders.
- Slow response to payment applications.
- Untimely addressing of problems and their solutions.
- Inadequate notification of required shut downs.
- Delays to acceptance of work.
- Untimely responses to field changes.
- Untimely correction of construction errors.

Problem #7 - Planning and scheduling - appears 396 times - 14% of total

Sample Problem Statements

- Not providing good project planning.

- Lack of consideration for what Mother Nature can do to a job site.
- Lack of communication on short term scheduling.
- Poor planning that results in crises management by owner.
- Lack of commitment to schedule by contractor.
- Not ordering materials in a timely manner.
- Untimely delivery of supplies and equipment.
- Poor schedule for submittals that requires too many at one time.
- Schedules established without input from affected parties.
- Failure to obtain utility input when preparing construction schedule.
- Late or untimely selection of colors/materials.
- Doing work out of sequence.
- Owner not providing definitive program and schedule of their work.
- Not setting design due dates for schematics and design development work.
- Bid shopping resulting in delays and damaging schedule impacts.

Problem #8 - Organization, authority, and responsibility - appears 371 times - 13% of total

- Lack of clearly defined chain of command.
- Not taking responsibility for actions.
- Lack of clear identification of decision makers.
- Lack of clear path for resolution of field problems.
- Lack of clear responsibility for clean up.
- Lack of clear responsibility for providing material lay down areas.
- Unclear definition of project mission and budget.
- Design team pushing design responsibility to trade contractors.
- Lack of field engineers having authority to make decisions.
- Lack of usable organization plan and chain of command.
- Poor time management: inefficient meetings, tardiness.

- Poor definition of the method of processing progress payments.
- Lack of authoritative owner project manager.

Charter objectives are derived from problem statements such as listed above which are identified in the charter workshops. If the problem statements are properly translated into charter objectives, they should provide an accurate preview of possible problems and give the stakeholders some ideas on how to avoid them. An accurate preview conveyed to competent managers will often encourage early resolution of some of the most common project problems. If the problems most frequently found to be troublesome in a planning, design, and construction project can be anticipated and prevented, the charter and the partnering system will have been well worth the effort. This is a basic reason for using partnering.

A few case studies related directly to some of the most prevalent problem areas might help provoke thought as to how extended uses of partnering workshop results can be used to improve management practices in construction-related organizations.

Problem #1 - Job management - appears 1,146 times - 40% of total

The most frequently mentioned problem category is job management. Its high number of mentions, 1,146 or forty percent of the total, indicates it is an area of potential improvement that should be explored continually to determine how to make job management work better for the total company good.

Knowledge of the process that produces good design and construction results is a critical ingredient of effective design and construction project management. It is a process-knowledge gained through technical education, participation in successful--and not so successful--design and construction efforts, and experience adequate to

predict accurately what might happen given a certain course of action.

The quality of job management is also related to the education⁴ and training⁵ the emerging manager receives. Education without training may produce a manager who believes that the educated manager can successfully apply his or her skills to any system that requires managing to work effectively. Training without education tends to produce a manager whose confidence in the learned-doing skills can be coupled with minimal education to be a successful manager.

Above all the management of planning, design, and construction programs requires a heavy portion of sound leadership in its managers. The debate rages on whether or not good managers must be good leaders and whether good leaders must be good managers. We find all combinations in generic construction. Few, however will argue against the thesis that if the two skills are found together in a person, the probability of that individual being a successful manager is very high.

The Thompsonville Learning Experience is a case study in which the qualities of education, training, and leadership are illustrated and merged to produce an example of what can happen when synergy is at work in intelligent and understanding people.

Case Study 14.01- The Thompsonville Learning Experience

Thompsonville voters have just approved a long-awaited school bond issue. The school district staff has started early planning work on a twenty million dollar elementary, middle, and high school remodeling and new construction program.

⁴ Education is the teaching and learning process by which the principles of doing things are conveyed to the learner.

⁵ Training is the teaching and learning process by which specific, explicit methods and systems of doing something, usually by rote, are conveyed to the learner.

Excitement is running high in Thompsonville among teachers, parents of school children, and those involved in the planning, design, and construction profession.

Of major interest is that there have been some changes on the school board since the bond issue was first proposed. One significant event was the election of a successful local business man, Al Lockland, to the board. Mr. Lockland is known to advocate very tight controls on all school-related expenditures. He has little or no planning, design, or construction experience but does exert considerable influence in Thompsonville. People tend to follow his leadership.

At Mr. Lockland's suggestion the board voted to save the remainder of the project programming fees by having the school staff write the project program instead of retaining the architect and engineer to prepare it. Once written, they plan to have their consulting architect/engineer, Smith and McConnell review and critique the program document.

Smith and McConnell (S & M) was selected prior to the bond issue to help the school district set the program parameters and preliminary target costs. These were used to determine the amount of the bond issue to be voted on. S & M had assumed that their firm would be selected to write the full program if the bond issue passed. They also had been tentatively selected by the school district's staff as the architect/engineer of record. With this dual responsibility implied, Martin Smith, one of the partners, took on the project manager job for S & M to insure it received top management and design attention. He is understandably puzzled by the school district's decision to now attempt writing the program in-house.

Mr. Smith is an experienced and highly regarded design professional. He knows the path to a successful project sometimes takes unexpected twist and turns. S &

M has had a long and very good relation with Thompsonville schools, and Mr. Smith feels he will probably have to question the programming decision at some appropriate time in the near future. However, he and his partner, Lynn McConnell, have decided they will make every effort now to work in the interest of the Thompsonville School District and to help carry out the program as anticipated in the successful money-raising campaign.

The school board has appointed Carl Burton, the district's financial officer as its program writer and project manager. Mr. Burton is a conscientious and capable financial officer. He knows very little about design or construction. He and Martin Smith get along very well and they have been through many smaller projects together. In discussing how to proceed with the project, Martin been retained by Carl to help him with the program on an hourly basis and to review the material as it progresses. There is no word from the school board whether or not S & M will be the finally selected design team.

As the project proceeds, Carl Burton quickly saw he had neither the time, the experience, nor the knowledge to write the complex program appropriate for this size job. Mr. Burton brought the matter to the board and after considerable discussion and some disagreement among the board members, the board finally agreed to consider a different course of action. This, only after a very harassed Carl Burton said he could not possibly do the programming job he had been assigned without professional help.

He had been consulting with Martin Smith on an informal basis over an occasional lunch or breakfast to save as much as possible on the programming costs. When he decided to shed the programmer assignment, Carl Burton recommended that Martin be given the program responsibility on a fee to be negotiated. At the board's request, Carl agreed to continue his work with S & M

at a reduced level of involvement.

Ultimately, the full program was written by Martin Smith, who was also selected as the architect of record; S & M prepared the contract documents on schedule, and these were issued for competitive bids to several local general contractors and specialty contractors. The Thompsonville School Board was heavily pressured by Mr. Lockland to award separate prime contracts for general, mechanical, electrical, food service, and controls work. These separate primes were ultimately to be assigned to the general contractor.

The low-bid general, Maxima Construction, has a doubtful reputation for both integrity and competence. Its track record on payment practices and job management is especially poor. This is well known among construction professionals in the Thompsonville area. The low-bid mechanical, electrical, and food services contractors are all good contractors who were dismayed to see that Maxima was the low general. When the bids were opened all three would have refused the job except for the fact they would have had to forfeit their bid bond. Such action would have been a mark against their record. Also, they were looking to Martin Smith and Carl Burton to guide the project through to completion. The controls contractor was satisfied with his contract and had no objection to being assigned to Maxima.

The attitudes of the successful contractors and the nature of the project delivery system being used tended to make this a moderately high potential claim-prone job.⁶ Despite the shaky start, the school expansion program seemed to get off on the right foot. This was in part because S & M and Carl Burton strongly recommended the School District establish a project partnering system on the job. Mr. Burton had continued being the official school board representative on

⁶ See Chapter 5 for a description of claim prone construction projects.

the project. In this situation he commanded considerable respect because of his reputation for fairness, balanced judgment, and good management of the school district's financial affairs.

Nobody on the project had been involved as a stakeholder in a partnering system previously. However, most of the project participants had heard of project partnering and were enthusiastic about trying it.

Even the superintendent and project manager for Maxima were excited about the partnering effort. They had been telling their company management that it was time to change the local industry's perception of Maxima as a less-than-reliable contractor to one more favorable to the future careers of key staff members. They were also enthused about receiving help to mold a smoothly-working project team from the good design and contractor group assemble for the project. The field superintendent, Phil Marconi, and the project manager, Lou Hillston, are competent people and have been with Maxima about five years. They both have a string of successful projects in other communities with the Maxima organization.

The partnering charter writing came off well with nearly thirty-five stakeholders participating. All signed the charter, and many stakeholders volunteered to participate in the task force work to write a partnering evaluation system, and an issue resolution system.

The charter monitoring task force has written and implemented its evaluation system. The monitoring system has been cautiously but positively received by the full project team. Monitorings are once per month and reported on by the stakeholders to the entire project management team.

Five of the charter objectives that were of special significance to the stakeholders on the job are listed below. Achievement of these objectives is important to project success since they represent some of the most important management actions to be measured by monitoring the charter. They also are concerned with some of the historically weak leadership and directive abilities of two principle players on the project, the Thompsonville School District management, and the general contractor Maxima's ownership and management.

The objective par weight (w) and par performance (p) assigned by the stakeholders is noted following each of the objectives. The product of the two, gives the acceptable target level of performance is designated as the par rating.⁷

- Objective 02) Prepare and maintain with all stakeholders, an accurate project critical path network and a short term schedule of work. w = 4.2, p = 3.5, par rating = 14.7.
- Objective 03) Make prompt, full payment of all properly submitted pay requests. w = 4.0, p = 4.5, par rating = 18.0
- Objective 08) Prepare, publish, and adhere to a chart showing channels of communication, responsibility, and authority. w = 3.5, p = 3.8 , par rating = 13.3.
- Objective 13) Prepare, publish, and implement procedures to be followed for resolving disputed issues and problems promptly, and at the originating level where possible. w = 4.0, p = 4.0, par rating = 16.0.
- Objective 14) Be a good on site and off site neighbor. w = 3.0, p = 3.5, par

⁷ See Chapter 13, Section B for a detailed description of the various elements of the partnering evaluation system.

rating = 10.5.

The first month's rating of partnering performance shows the following result for these five items. The reason for the importance of the rating trends for these five charter objectives is that they relate to potential deficiencies in the stakeholder organizations, particularly Maxima's. The calculated par weight multiplied by the actual performance rating each month is shown in column two.

Table 14.01--Charter Ratings for Thompsonville School

<u>col 1</u>	<u>col 2</u>	<u>col 3</u>	<u>col 4</u>	<u>col 5</u>	<u>col 6</u>	<u>col 7</u>
<u>Objectives</u>	<u>Par</u>	<u>mo. 1</u>	<u>mo. 2</u>	<u>mo. 3</u>	<u>mo. 4</u>	<u>mo. 05</u>
#02 Planning and scheduling	14.7.....	10.0	-	-	-	-
#03 Payments	18.0.....	11.3	-	-	-	-
#08 Organization, communication, authority	13.3.....	10.5	-	-	-	-
#13 Issue resolution	16.0.....	09.5	-	-	-	-

#14	10.5.....	10.0	-	-	-	-
Be a good on						
site and off						
site neighbor						

After the first month’s ratings were tabulated Martin Smith, the architect, Carl Burton, and Mr. Lockland of the Thompsonville school system met in the school cafeteria for lunch. Mr. Lockland had seen the ratings and was questioning some of the results since he had submitted a performance rating of his own. “The stakeholder ratings”, he said, “were all out of kilter with his.” Being an intelligent and well-intentioned man, he was curious as to where his thinking and measuring were different than that of the stakeholders.

Martin Smith said, “let’s look at the five objectives that Carl and I are specially interested in. They represent, in our opinion, a good measure of some of the project staff weaknesses that must be strengthened for the project to be successfully completed.”

The first objective they discussed was charter provision 02 - Prepare and maintain with all stakeholders an accurate project critical path network and a short term schedule of work.

Par performance was set at 14.7; the first month’s rating came in at 10.0, considerably below what should be expected during so critical a planning period in the job. Mr. Lockland said he had expected a higher rating also. He also related that Maxima’s field superintendent, Phil Marconi, had told him on a field visit that the president of Maxima wants to keep scheduling expenditures to an absolute minimum since it is basically an overhead expense. The resulting lack

of attention by the general contractor is what has caused the rest of the stakeholders to have given the vital scheduling process a low performance rating.

The second objective reviewed by the group was charter provision 03 - Make prompt, full payment of all properly submitted pay requests.

Mr. Lockland said he thought the single monthly payment to date had been made with reasonable promptness. He had rated this at 17.0 just under the par of 18.0. His lower-than-par rating, as he admitted, was given because he had tried to lower the request amount from that approved by Martin Smith last month and the delay in considering the reduction caused the payment item to miss the agenda deadline. Carl Burton said to Mr. Lockland that payments are the life line of any construction project and that tampering with the contract-stipulated process would bring quick negative response. Martin Smith said this was certainly true and that the stakeholder rating of 10.00 was an exceptionally low report card grade for the owner.

Mr. Lockland somewhat unwillingly agreed that he would not interfere with the payment process again. He correctly deduced that the field and design staff were perfectly competent to evaluate the accuracy of the draw. Shopping for delays to payment in order to produce added interest for the owner was, as Mr. Smith pointed out, one certain way to quickly lose the support of the construction team.

Charter provision 03 - Prepare, publish, and adhere to a chart showing channels of communication, responsibility, and authority was the next selected charter objective to be discussed. The par rating was 13.3, the stakeholder rating was 10.5, again--as with the previous two items--considerably lower than where it should be.

The problem, said Martin Smith, was that Maxima did not want to expose its management and authority structure to the other stakeholders on the job. "Why, then," asked Carl Burton, "did they agree to it and support it as charter provision?" Mr. Lockland added a bit of wisdom from his business experience-- "Maxima management just doesn't want their own internal staff to find out how little clout the staff actually has. Perhaps an informal discussion with Maxima's president and two or three of the school board's members might help shake some kind of chart or statement loose. We'll tackle this issue and report back to you, Martin, on the result. We've got to get that rating up."

Charter provision 13) Prepare, publish, and implement procedures to be followed for resolving disputed issues and problems promptly, and at the originating level where possible came up for discussion next.

Carl Burton related that the procedures had been published and were in effect, but the very first issue that arose was the early slow payment situation. In this matter, which the contractors called an issue, the school, and perhaps Smith and McConnell also, were not interested in following the "resolving at the originating level promptly" precept in their work. The result was predictably, a very low rating of 9.5 compared to a par of 16.5.

The luncheon partners next touched on the fifth selected objective--14 - Be a good on site and off site neighbor.

Mr. Lockland asked how the on-site and off-site neighbor relations were being maintained. Martin Smith said that the residents in the area were beginning to complain about the dirt being dragged from the site by the excavator. He said the specifications required Maxima to clean up but they had been somewhat derelict.

He added that he would talk to Lou Hillston, Maxima's project manager, this afternoon about doing a better job on the off-site clean up.

Otherwise, the rating seems to indicate that most stakeholder feel the trades are keeping their own areas clean and passable, that site conditions for parking and access are being well maintained, and that layout of the site went well with no major discrepancies encountered. The key to ongoing good performance will be in how effectively the existing school users will be protected from construction work as project foundations are completed.

The total charter par target is 17.5, and the first month's performance rating for all charter objectives was 14.0. This is not even an average performance and as all three admit, must be improved if the project is going to be considered successful.

In summary, Mr. Lockland says, their informal discussion about the five selected charter objectives has brought out the following points.

A. Maxima, the subcontractors, the design team and the owner must immediately bring up their performance level in planning and scheduling. Mr. Smith will discuss methods of doing this with Phil Marconi and Lou Hillston of Maxima tomorrow at the site.

B. Mr. Lockland, with guidance from Mr. Burton and Martin Smith, will take steps to streamline and improve the payment process. If Mr. Lockland wants to be involved in reviewing pay requests he will not interfere or delay payment of legitimate, properly-submitted billings.

C. Irrespective of the internal organizational structure that's used by the stakeholders, the owner, the architect/engineer, and the interacting other

contractors are all entitled to know what relations they are expected to maintain with other stakeholders. Mr. Lockland and two or three others from the board will meet informally with Maxima's president and ask him to set an example and take the leadership in getting a project organization chart that will accurately depict the interrelations of people on the project team.

D. All three agreed they would have to shift more support to the issue resolution policy, particularly since the owner seemed to have been one of those apparently showing little interest in resolving the very first issue of importance to the stakeholders, a delay in processing their payment request. Future payments are to be expedited to the best of the architect's, engineer's, and school board's abilities.

E. Being a good on-site and off-site neighbor was rated fairly well. However, there will be an ongoing need for cleaning roads, maintaining security, providing night lighting that will not be a nuisance to the neighbors, and each of the other items that can endanger job performance. Mr. Lockland said as they left the cafeteria that, if there were no objections, he might organize a be-a-good-neighbor task force from the school board to monitor neighborhood attitudes towards the project. This, he feels, might bring the school users into a closer relation to the project and improve local relationships.

Over the next four months S & M and the school board watched the charter evaluations carefully/ Figure 13.02 show the monthly evaluations for the five objectives of greatest concern to them.

Figure 13.01

<u>col 1</u>	<u>col 2</u>	<u>col 3</u>	<u>col 4</u>	<u>col 5</u>	<u>col 6</u>	<u>col 7</u>
<u>Objectives</u>	<u>Par</u>	<u>mo. 1</u>	<u>mo. 2</u>	<u>mo. 3</u>	<u>mo. 4</u>	<u>mo. 05</u>
#02 Planning and scheduling	14.7.....	10.0	11.2	12.3	11.5	12.8
#03 Payments	18.0.....	11.3	12.5	14.0	15.0	17.0
#08 Organization, communication, authority	13.3.....	10.5	13.2	14.2	13.0	14.0
#13 Issue resolution	16.0.....	09.5	12.2	13.3	15.0	14.0
#14 Be a good on site and off site neighbor	10.5.....	10.0	11.0	10.5	12.0	12.5

As the project moved ahead there appeared to be a perceptible improvement in the management of the project. Planning and scheduling improved and at the end of month five, the master network plan has been prepared, and four-week

short term schedules are being issued by Maxima at each weekly job meeting. Subcontractors are still not providing all the input they could but Maxima's superintendent, Phil Marconi, did convince his executive staff that the school board was very serious about good planning and scheduling. Maxima has hired an outstanding planning and scheduling consultant to work with the field superintendent and the project manager. Lou Hillston, Maxima's project manager feels that by evaluation period six, the rating will have reached or be greater than the par of 14.7.

Payment practices from the owner and from Maxima have improved but still have a long way to go. Maxima has glue on its fingers when it comes to paying the subcontractors. However, the improvement in owner payment turnaround has removed one of Maxima's excuses for late payment. In addition, Mr. Lockland has had some long conversations with Maxima's president about his future work on Thompsonville projects. Management of money has evened out since and the improved project performance shows the positive effect of this on job management.

Organizational relationships have been clearly defined now and most job personnel know much more about the chain of command, the authority and responsibility patterns, and the communications channels they have to use to be most effective. Charter objective 08--Prepare, publish, and adhere to a chart showing channels of communication, responsibility, and authority--performance rating have risen from 10.5 in the first month to 14.0 in the fifth month measured against a par of 13.3. This is good news and shows considerable improvement in job management.

Issue resolution problems have not appeared since the first conflict about delayed payments. There are still some rumblings about some of the owner's strongarm

methods in reviewing requests for payment. Mr. Lockland, though has become a crusader in getting more prompt action on pay requests.

The last of the five management-oriented charter provisions was being a good neighbor. The good-neighbor task force assembled from the school board has done its job well and ratings have risen 2.5 points in five months. This is 2.0 full points above par. The effort to improve off-site relations carried over into the on-site work and currently everyone seems happy with how the site is being managed.

Problem #2 - Communicating with others - appears 984 times - 34% of total

Effective communications of all types and at all levels play a crucial role in the generic construction industry. The difficulty encountered when trying to improve communications is that the analysis of what is wrong and the solutions rarely consider the problem in adequate detail to actually make communications better.

Communications technology today has reached a point where the machines are so dazzling and exciting that many feel the mere presence of a fax machine or the use of fiber optics or capturing of signals by a communications dish will right all the wrongs of our communications dilemma. Not so. Effective communications among and between people on design and construction projects need careful substantive⁸ attention in their development and use. The machines we use to communicate merely allow us to increase and accelerate information transfer. They do not automatically improve the results we obtain from the interchange. Case study 14.02 illustrates how the need for communication within a company can change as the organization changes. Effective communication results from human systems working in synch with techno systems to produce a product people can and want to

⁸ Used here to mean belonging to the real nature or essential part of something.

use as tools to improve their performance.

Case Study 14.02 - Larson Development's Communication Overkill

Frank Larson is a very successful developer. He also is a man who believes in operating his business on an everyone-should-know⁹ basis. This system was put into use at Larson Development when the total staff included Frank, his wife, one secretary, and a part-time real estate broker. The four of them met twice per week for about an hour to bring each other up-to-date on what was happening on their projects and holdings. These meetings were absolutely essential to the four working productively without expensive overlaps and destructive conflicts. Construction volume in these early days was about one million dollars annually.

In a short time Larson Development grew to where it now employs forty people with a real estate management portfolio valued at nearly fifty million dollars. The annual construction volume has increased to about fifteen million. However, most of the employees are still expected to maintain an everyone-should-know communications system on their projects and in their daily work. Exceptions are made for confidential leads and on early financing and syndicating actions.

Larson is about to begin construction of a fifteen million dollar office campus in a nearby community. Tom Davis, a construction project manager with fifteen years of solid experience, has been hired to run the project for Larson. He has been very busy in his first five weeks moving the new job into design and producing the first construction document package for site preparation and construction of the foundations, superstructure, and the exterior skin of the

⁹An organizational communications system based on the managerial belief that if everyone knows what all or most other people in the organization are doing and working on, the organization's overall output quality will be superior.

building. Tom has recommended to Frank Larson that the project team plan and implement a partnering system to be implemented at various phase points in the job¹⁰. Mr. Larson, an astute people-oriented person, has been studying the partnering concept for several months and agrees the job should be partnered.

Tom Davis is very happy at Larson Development. He has found it to be a highly professional firm, it has a good reputation and is staffed with some exceptionally high caliber people. The only irritant in his first five weeks has been about the constant information requests from Mr. and Mrs. Larson, the bookkeeper, the financial analyst, and some of the salesmen and tenant coordinators. All these people have asked him to keep them posted weekly on the project's progress.

Tom is a man who is accustomed to being a good team player while still retaining the prerogative to move ahead in the direction he feels is best without always having to share his reasons with others outside the immediate action arena. Tom realizes this course of action is not always correct or best. However, he has fallen into an independent action mode and understands he may have to modify his management style in his work at Larson.

During project mobilization and move onto the project site, Tom and Mr. Larson announced that partnering was to be used on the project. A week later the charter writing session was held at a hotel near the site. By this time a general contract had been awarded to Berke Construction, and all of the major sitework, foundation, superstructure, and close in subcontractors had been placed under contract directly with Berke. The owner-provided furnishings contract was awarded by Larson directly to an interiors design-build firm.

Many of the participants and stakeholders selected for the project have worked

¹⁰ See Chapter 8, Section B and Chapter 10, Section A for discussions of the relation of project phases to partnering efforts.

with Larson Development in the past. Many compliments and congratulations have been passed along to Tom about his new position with the firm. All who know him have indicated their pleasure at having him on the job for Larson. In general field work on the new building seems to be off to a good start.

During the charter problem identification workshops, Tom noted a heavy emphasis by the stakeholders on potential communications difficulties in the project. At first he thought these were the usual indistinct, general, and sometimes fuzzy statements about generic communications. As the charter writing proceeded however, Tom began to see emerging in the session, a specific theme of communication alerts from their project team. Typical of potential problems the stakeholders mentioned were::

- Not defining and following agree-upon authority and responsibility lines.
- Multiple parties presuming to speak for the owner, the design team, and the prime contractor.
- Too many project spokesmen and women.
- Making schedule and specification changes without informing the affected participants.

Other problem comments were made that strongly indicated project stakeholders wanted project communication, authority, and responsibility lines clearly established on the site. They also wanted to reduce or eliminate any reporting channels to off-site personnel in any of the stakeholder offices. The entire matter of communicating within and without the stakeholder project team was addressed in the charter objective that states:

"05) Stakeholders will attempt to communicate effectively and on an as-needed basis. Stakeholders commit to be available, to recognize the need for

quality information provided in a timely manner, and to clearly identify the project chain of command showing communications flow, responsibilities and authority."

Mr. Larson, who had attended the charter meeting for the full day, was chatting with Tom at the social hour after the charter had been signed. He asked Tom, "What was the significance of that charter provision five?" He continued "Today, some of the stakeholders who know me particularly well asked if I really intended to communicate more effectively on this project."

Tom tactfully pointed out that from his viewpoint the charter objective was designed to help streamline communications among the stakeholders and cut down on the amount of casual project-related information that had in the past been sent or received by those not directly involved in the job. Frank Larson said that he would be interested in seeing how well the stakeholders adhered to the need-to-know policy since he had always thought that most people liked to know all about their work and the work of others.

In the first charter monitoring the stakeholder's evaluation gave charter provision five, the communications and chain of command provision, a weighted performance rating of 12.0 against a weighted performance par of 14.8. The second month the communications rating dropped to 10.9 and some grumbling was heard about slow payments, cross communications from the leasing people, and conflicting directions being given by Larson's office staff to some field personnel.

Mr. Larson asked Tom to have breakfast with him and asked why some of the weighted performance ratings were declining. Tom briefly outlined the reasons and his recommendations to turn the ratings around. He said there seemed to be

three main reasons based on discussions at the evaluation sessions:

- One - Larson's accounting staff insists on reviewing each general and subcontractor request for payment directly with the contractors. This meant that some of the subcontractors had to justify their payment requests once with the general contractor, once with him, and once with the accounting group. It was requiring a lot of expensive time and reworking to accomplish a relatively simple job.

Tom's recommendation - Eliminate the accounting group's review of subcontractor's payment applications. Tom can make his review of the general contractor's and the subcontractor's request at one time and bring them to the office for accounting to check. Or they can come to the field to do the check. He estimates Larson can trim at least one week in processing all payments, can considerably enhance its reputation with all the contractors, and might even begin to get better pricing from the contractors on future jobs.

- Two - The Larson office staff has resisted (formally and informally), all efforts by Tom to prepare a project organization, responsibility, and communications flow chart. The office staff has also been slow to provide information to Tom that would allow a stakeholder task force to complete an organizational matrix required by the charter. This chart is to show responsibilities to and from all job management personnel. Lack of information from Larson for the task force has interfered with stakeholder efforts to complete the required matrix.

Tom's recommendation - That Mr. Larson and Tom prepare and distribute an organization chart as it applies to this project only. In addition, that Mr. Larson provide Tom with additional responsibility, authority, and

communications information that can be considered when preparing the stakeholder's task force responsibility and communications matrix."¹¹

• Three - Many documents, including critical requests for information from the stakeholders have gone astray in the Larson information system. Apparently, over the years the firms that have worked on Larson's smaller projects have merely sent all documents to the main office, addressing them to Mr. Larson. He then gave them to his secretary for distribution.

This project, however, is much larger than any previous Larson project. The need for prompt, well-directed transmission of spoken and printed directions is far more urgent now than in the past. In addition there are many more faces, some very new, in the office. These people do not know much about how things were done in the past and have not been told how to handle and route designer and contractor communications.

Tom's recommendation - That project-related communications flowing into and out of the project be directed through his field office. Frank Larson and Tom should meet immediately with key members of the Larson support staff and prepare a description and instructions as to how all project-related information is to be routed and distributed on the job.

Several other points were discussed at breakfast, many aimed at strengthening Larson Development's efforts to improve communications on the project. However, Mr. Larson and Tom Davis took immediate steps to plug the dike where many of the complaints were originating.

At the third charter monitoring session the communications rating on charter

¹¹ See Case Study 14.08 in Chapter Fourteen for an example of a communications matrix.

objective five dropped slightly from 10.9 to 10.6. Mr. Larson by this time saw that the communication techniques he had needed and encouraged in his smaller company had not worked nearly as well in his growing organization. He also saw that any reduced overhead and increased development profitability was closely related to the ease with which information could be obtained and transmitted to the people best equipped to take action.

Tom Davis meanwhile took considerable heat from some of the office staff as he gradually redirected project-related communications from an unstructured flow to a very highly directed flow. He was somewhat used to this type of criticism however, and as his recommendations were implemented and worked without hurting anyone, his stature increased both within the company and on the job.

Good results began to show up in the fourth charter monitoring when charter objective five got a rating of 12.0, up from 10.6 the month before. The fifth rating made a month later showed a further improvement to 14.0, only 0.8 points below par. Of course, not all of the steady improvement could be credited to Larson Development and Tom Davis. Their actions had merely stimulated a general move toward improving project-wide communications through gradual company improvements.

In the Larson Development example the thoughtful, open-minded consideration given to the partnering processes by Frank Larson and Tom Davis, particularly to the partnering evaluation ratings, produced two results. The first was an improvement in project performance that benefited all stakeholders. Second, Larson's efforts helped to streamline the payment process and began to identify the true responsibilities and authority of the field and office staff relative to this specific

project.

As improvements continue to be made they should help make the firm more effective in their work, reduce overhead, and improve profitability. These results will benefit everyone employed in the Larson organization.

Problem #3 - Staff morale and attitudes - appears 684 times - 24% of total

Planning, design, and construction people are just like other people. Most of us want to be respected, want our talents recognized, like to receive deserved--and sometimes undeserved--praise, need help and encouragement in times of trouble, and want our work efforts appreciated.

A situation encountered in Dallas, Texas, several years ago illustrates how important an appreciation of good work efforts are. A well-respected general contractor was completing work on a new 900-room hotel. Hotel furnishings were being put in the guest rooms, and as an intermediate step were being stored in vacant areas of the hotel. One of the temporary storage areas was on the second floor in a large open space. Both rough and finish building trades were working in the area and by some quirk of fate, the masonry contractor, who had earlier left out a wall to allow construction trade access to a floor area, had come back in a work lull elsewhere to finish work on that floor. The trade access was no longer needed and so the masonry crew completed the wall across the open space.

Unfortunately, the interior furnishings crew was not watching and did not see the block wall being completed. The wall was up and complete in one day and the next day the furnishings contractor was down at the mason contractor's field office demanding that they remove the new wall. The furnishing contractor had been blocked from the freight elevators by the newly erected wall. There was no

immediate solution except for the general contractor and the masonry sub contractor to remove a part of the wall they had just erected. Ample assurance was given the mason contractor by the general that he would be paid for the wall rework.

When the masonry foreman was told to take the wall down he flat-out refused. His rationale was that if higher job management didn't know what was going on at that space, why should he have to correct their mistake by taking down his well-built block wall, put up in record time and built to his high quality level. He refused to demolish the wall or to put a new opening in the wall as a matter of principle.

Extreme?--perhaps, but certainly understandable from the viewpoint of a craftsman who didn't need a lot of practice building and demolishing masonry walls--particularly when it resulted, in his perception, from a dumb mistake by someone else. In his opinion, his work effort was not appreciated, and his reaction, though strong, exhibits how any good workman might feel if what he or she has done can be undone so easily.

This type of problem involves staff morale and attitudes. Partnering meetings bring out morale and attitude statements that without resolution can seriously harm work quality and production on the job site. This can be seen by the fact that such problems received the third most often mentions out of the forty-five problem classifications and 2,855 problem statements.

The real management challenge faced on a project is what to do about morale and attitude problems once they are identified. Earlier in this chapter I listed some selected problem statements that were made in charter meetings. How does the manager bring about performance improvement by better understanding and overcoming these types of problems in the office and on the site?

Case study 14.03 - The Bullseye Project

Bullseye Recreational Products, Inc., is a large assembler of motorized recreational equipment. The product line includes off-the-road vehicles, snowmobiles, jet water skis, and an extensive line of hard and soft accessories such as light-weight outdoor shelters, boots, backpacks, all-weather jackets, carrying attachments for sports equipment, and many others. Most of their products are assembled from parts others manufacture in all parts of the United States. The company and its employees are very proud of the fact that to the best of their knowledge, 85 percent of the parts used in the products they sell are produced in one or more of the fifty states comprising the United States.

Bullseye is currently building a new plant in its home town of Oxford, Wisconsin. It is to be a 200,000 square foot addition to the present facility. Design documents are complete, a general contract has been awarded to Stone Construction Company, a good local general contractor, and Stone has given purchase orders to about ten local subcontractors for work on the new plant. There still remain about five small contracts to be awarded as the job moves into the field.

Art Perry is the field superintendent on the project for Stone. He has been with Stone thirty years, first working there as a laborer during the summer months in high school. Art is a loyal, competent, conscientious man who gets along well with most people. He has good leadership skills and tries hard to study and learn new working management techniques.

His exposure to the management literature available at the Oxford Library has lead Art to recommend to Mr. Charles Stone, owner of Stone Construction, that

the company institute an in-house management training program for its new generation of field and office managers. Art has been so busy that he has put the program on hold for a while. Mr. Stone has many other things on his mind, and likewise has not followed up on the idea.

Art notes that the mechanical contractor on the Bullseye project has assigned Jerry Stressland, a foreman-superintendent, to the new job. Jerry had been on one of Stone's jobs about ten years ago. He and Art had had a very noisy and acrimonious argument one day that resulted in both men being strongly criticized by their superiors. Jerry was actually moved to another job by his firm because of the altercation. This created hard feelings strong enough to cause the two to deliberately avoid each other during the intervening ten years until now.

Art, as part of his ongoing education, has been studying the history of partnering in construction. He is impressed by the track record produced by its use in the Corps of Engineers and on several heavy construction jobs out west. As a result of his study, he has requested that Stone participate with the owner, architect, engineer, and subcontractors in a partnering effort on the job. Mr. Stone is agreeable, as is Barry Eychel, owner of Bullseye.

The major subcontractor managers on the job seem to be pleased by the opportunity to try partnering, although the old antagonisms still show in Jerry Stressland's attitude. He and Art have had some mild discussions about the Bullseye job, and Art is anxious to heal the old wounds that are still a bit raw from their decade-past conflict. Jerry doesn't seem quite so anxious as Art to rebuild their relationship. He is somewhat neutral toward partnering, but not hostile.

The decision to proceed with partnering has been made, the charter writing

meeting is in progress and stakeholders are currently working in the problem identification workshops. The participants have completed identifying and presenting to each other the problems others cause them. One of the stakeholder teams mentioned two problem items that were somewhat related to the Jerry-and-Art conflict:

"Lack of respect for other partner's space, materials and work in place."

"Poor attitudes and previous personality conflicts."

Art began to think over his ten-year old confrontation with Jerry. It was caused when the two men were working on a very tight site. Art was at that time a newly appointed superintendent for Stone. He had been told by the owner of the project that Jerry's trailer was incorrectly located in an area which the contract specifications clearly said was reserved for owner parking on the job site.

Jerry, the mechanical foreman on the job, when approached by Art, said he knew nothing about the restriction, since he did not have the general requirements for construction parking in his bid set. Jerry was right--the specification section had been accidentally left out of the mechanical specifications. However, Art felt he had no alternative but to insist that Jerry move to a far corner of the site. Jerry felt betrayed by Art and by Stone both, and considered he had been abandoned when he needed their help. The result was a steadily eroding relationship that lead to the severe criticism leveled against both of them by their bosses.

As the workshop discussions of potential problems on Bullseye continued Art noticed several other items that he had been somewhat indifferent to in his own management career. He had tended to shift job clean-up costs from Stone down to the subcontractors all too often. In fact on the Bullseye job he had already

transferred more clean up from mobilizing and moving on the site to his subcontractors than was warranted. Bullseye was very fussy about site cleanliness, and the image presented to the public was very important, particularly to its Wisconsin neighbors. Costs for clean up had been higher than Art wanted to spend this early so he had spread the extra cost among his subcontractors, and not too fairly.

Others in the room also began to think about the matter of their attitudes and morale as the presentations and discussions continued. Mr. Eychel, owner of Bullseye, was thinking as the meeting proceeded that he had to tighten up on his decision making and provide project design and construction answers more promptly than he had been doing over the past several months. Frank Fischer, the architectural project manager, said to himself as the matter of slow shop drawing review and approvals was brought up, that he was spending more time on shop drawings and being far more critical than was warranted. Frank had two or three recent unfortunate experiences with contractors trying to push him too hard on submittals. He admitted to himself he was becoming more nit-picky than was warranted--maybe this was a time of change.

Jerry Stressland was thinking about the ten-year old argument with Art Perry, and about the Bullseye job and about his present situation. He remembered his boss telling him yesterday that the argument he had with Art ten years ago was past. Just before Jerry left for the partnering session, the boss added "Jerry you're where you are now, and you can't be anywhere else. Don't always be reliving history."

And so it went. By the end of the long charter day many of the stakeholders had some second and even third thoughts about past experiences and present problems that were presumably caused by others' real or imagined attitudes and

remarks. The open discussions of problems that might be encountered and the injection of outside opinions of the importance of some of these problems had a sobering but relieving effect on many of the stakeholders.

A few days after the charter meeting Art Perry decided to approach Jerry Stressland and try to patch up their differences. He did and his attempt at a reconciliation impressed Jerry. It was a good move, and it worked to a limited extent...And it was welcomed by Jerry. There were still be some rough edges to smooth, but the old resentment began fading fast in the knowledge that today's work must be done by people who are willing to live in today's world--not yesterday's.

A side effect of the partnering meeting was that Mr. Stone was very impressed by Art's performance in the charter meeting. After the meeting he told Art that the partnering concept might provide the base of a good in-house management training program for new field and office managers. Art volunteered to work on the project, and his offer was immediately accepted by Mr. Stone.

So, the Bullseye project was up and running. Some past enmities were resolved, the owner's decision making processes were improved, shop drawing processing got better and quicker, and Art is off on a highly visible training effort. Partnering helped provide the invisible catalyst for change because it helped stakeholders see where they could change for the better.

Problem #4 - Personnel quality and problems - appears 593 times - 21% of total

Quality is an elusive element to define in any individual's performance. Usually results must speak for the level of excellence. Other measurements are apt to be subjective and to contain emotional overtones that reduce their worth as reliable

barometers of value-added.

Partnering contributes to the overall good of a project by exposing all stakeholders to the scrutiny of their subordinates, peers, and superiors without encouraging any level of observer to become overly judgmental. A well-conducted charter meeting first mixes individuals within disciplines and then gradually combines the individuals into a total group. An important benefit the less-than-competent planner, designer, or constructor gains from the intense interaction among stakeholders is an opportunity to improve.

Partnering does not benefit the stakeholders by actually improving their work performance. Instead it benefits each individual by demonstrating what good can come from achieving higher competence levels. This is accomplished by all responsible project practitioners being exposed to the most competent people on the job. If we assume, as is usually the case, that the charter meeting is attended by most of the ultimate decision makers, then all attending are exposed to the management influence of those leading the project. Learning is then accomplished by benchmarking against these leaders.

Of course, excellence does not always rub off automatically, and it may be too much to expect all men and women who attend the charter meeting to improve instantly. However, the opportunity to improve is given and this is often a sufficient motivator to act as a needed catalyst for improvement.

Case Study 14.04 - The Maturing of John Fenton and William Tole

Langtree Robotic's president, Thomas Langtree, has for years visualized an office and industrial park development that contains related industries--businesses that might benefit from being near to each other. He has decided to implement

his idea by purchasing 1,100 acres of undeveloped land on the outskirts of Redford City, a commercial and industrial-based community of about 200,000 people. Mr. Langtree selected a site very close to a projected new regional airport, and one that will be served by a new freeway, US 18, now being designed by the highway department. The airport is planned to be operational in four years. The freeway is to be open to traffic in two years.

Mr. Langtree intends to build a 150,000 square foot state-of-the-art manufacturing plant as the initial facility on the site. It will have adjoining design offices, laboratories, and testing and demonstration facilities containing another 100,000 square feet of floor space on two levels. The total *proforma* cost set for the Langtree phase one facility is about thirty million dollars.

Mr. Langtree has inquired of his business and professional associates about architects, engineers, and contractors who might be equipped to work on this prototype. He has finally settled on an planner, architect/engineer, and contractor team that he feels will produce the facility he wants.

Wilson Allen, Ltd., is the planner; Langley Evans Associates is the architect and engineer; and Rhodes Construction Company has been selected as the construction advisor. Langley Evans has appointed John Fenton as project manager. Mr. Fenton is a reasonably good designer and production architect--much accustomed to working with contractors on hard-money, lump-sum jobs.

Rhodes Construction has selected Bill Tole as its project manager. Mr. Tole recently joined the firm as a project manager and will be in charge of all work for Rhodes through planning, design, and construction. His background is basically in industrial manufacturing buildings, although he is knowledgeable about office and research and development facilities.

Mr. Langtree has given Wilson Allen the go ahead to start on site plan studies and to work with the architect/engineer and the construction advisor to write a program for the job. As these program meetings proceed three facts begin to emerge:

1. The concept of an integrated business park of related enterprises is understood by the planner. However, John Fenton, the architect has expressed his feeling that working drawings for Langtree Robotics must be started immediately if his firm is to finish the contract documents in timely fashion. Mr. Langtree expects considerably more planning and total program effort from the team before moving into schematics and design development work.
2. The construction advisor, Bill Tole, is pushing hard for construction documents to be started so he can begin early procurement on the project. He appears to be marshaling support among the Langtree Robotics staff for following this course of action. They are anxious to get into the new facility
3. William Allen, the planning firm project manager, has not exhibited the leadership qualities that Mr. Langtree had anticipated. The vacuum created is being filled in part by John Fenton, but especially by William Tole.

The unintended shift in control of the project planning and programming to production-oriented team members is viewed with some alarm by Mr. Langtree. He sees his vision of a prototype business park threatened by hasty action to get a project built. His view is that he is willing to allow time and to spend the money to produce a product consistent with his long range ideas.

Efforts to convey this to the project team in meetings has not worked. One

reason is that the meetings are dominated by Mr. Allen. Another reason is that Mr. Langtree is not an expert in planning, design, and construction. He is depending on his project team to do this work. However, he sees now they do not understand what he wants and he isn't certain they know how to produce it, even if he could explain it well enough.

He arranges a dinner with Larry Rhodes, president of Rhodes Construction, to make a final effort to clear things up. At the meeting Mr. Langtree lays it on the line. He admits he has probably not explained the project concept well enough to those doing the work; he is deeply concerned that he made a mistake having Wilson Allen, the planner, so heavily involved in writing the program; and he is worried that the present personnel on the job don't have the abilities to accomplish what he expects from them.

Larry Rhodes is not startled by what he is hearing since he sensed the loss of direction from regular reports he receives from Bill Tole. Larry also keeps in contact with Langley Evans, the architectural principal for the project. Langley is worried about his manager, John Fenton, pushing too hard and too fast.

Larry suggests that the current project team assemble and outline where they are, what their mission is, what they can do about achieving it, and then decide on a course of action. In essence he is suggesting they convene an informal partnering meeting to turn the project around by examining their problems and creating some solutions.

Mr. Langtree is delighted. He wants his job to succeed and he feels the people now involved can do the job. He just doesn't know how they will do it based on their present actions.

The partnering session is called, the entire project team is there, including the Langtree Robotics operations and manufacturing staff, the principals and project managers from the planners, architect/engineer, and the construction advisor, along with Mr. Langtree. During the workshops the problems and their solutions begin to surface. Some of the facts that emerged included:

1. Mr. Langtree's concept of an interrelated industrial park was not known by some and not understood by others. In essence, the basic idea had disappeared as a planning guideline.
2. Neither Wilson Allen, the planner, nor John Fenton are experienced at program writing. They have been proceeding as if their parameters were primarily set by the site boundaries and what the Langtree operations and manufacturing staff had told them.
3. The *proforma* analysis expected from the efforts of the planner, architect/engineer, and constructor had not even been discussed in their meetings. Further, none of them had the experience or knowledge to prepare a *proforma* cost analysis to set design parameters.
4. The Robotics staff thought Mr. Langtree was totally aware of the work going on and had given the project team permission to move immediately into working drawings and final estimating.
5. There was no mission statement that had ever been produced by the project team.
6. The talents of the project team were not being fully applied to work they knew they could do. Likewise, some of the things expected of them, they

freely admitted, they were not qualified to do, such as writing the program, preparing a *proforma*, and several other critical early elements.

The list of problem statements was long and embarrassing. However, the solutions were quick to come. All of the firms wanted to stay on the project, the Robotics staff were excited about the concept and wanted to participate, and aside from a few bent noses among the participants, all agreed that a turnabout in management of the project was essential.

Things to be done included:

1. Langley Evans, the architectural/engineering firm principal, and a reasonably good program writer, would immediately take over the project and see that a tailor-made program was written.
2. Bill Tole would shift his immediate attention to providing cost estimates at the scale and time frame consistent with the accuracy of the information provided by the architect/engineer.
3. Wilson Allen would immediately set a phased site development budget with Mr. Langtree and Robotics financial advisors. He would then work to that schedule of expenditures to produce a phased site plan construction program.
4. Bill Tole would work with Wilson Allen to price out the proposed site work plan and set cost controls to meet the projected site work budget.
5. Langley Evans would retain a civil engineering firm to take the phased site plan and translate it into site working drawings.

6. Langley Evans and John Fenton would identify and schedule all front end work and design package production work needed to start the job in the field within the next five months.

There were many other action elements that were decided on in the meeting. Some of them appeared in a charter that all of them signed. Other, more production-oriented activities, were noted to be done within the next week by the project staff.

By the intelligent and adaptive use of partnering, a potential design and construction disaster might be avoided. Might? It's too early to determine if the people on the job are competent or not. Presumably they are. In that case the job could well be turned around and be a huge success. If not, the people involved learned a hard lesson about people quality and problems.

Problem #5 - Being a good on-site neighbor - appears 475 times - 17% of total

Many of the good-neighbor problems identified in partnering meetings concern bad manners, and poor management. Experience with partnering results in respect to being a good on-site neighbor is not conclusive since measuring results must often be done in a relative rather than an absolute sense. However, reports back from partnered jobs indicates that the respect shown others, the avoidance of damage to others' work, the general attitudes of stakeholders toward each other, and the improvement in practices that make the work site a better place to be generally improve if the charter addresses them specifically.

To see why we must go back to the concept of what people are like and what they want in order to see how their attitudes are improved if they give full attention to

living by the charter.

As we have said earlier, most people are honest, concerned, desirous of challenge, need attention, and welcome help in times of turmoil. I recently was helping write a charter on a very large office building addition and the stakeholders were struggling to write a section in the charter about how they should behave toward each other. This matter had only a distant relation to extra costs, delays to the job, bad weather, pending change orders, and other more common problems. Yet those forty-eight highly paid people spent an inordinate amount of time struggling with how to express how to be a good neighbor.

One of the stakeholder finally suggested "why don't we just say--treat other stakeholders as you would have them treat you." There was a moment of dead silence in the room and then a ground swell of agreement that clearly said--that's it, that's the charter objective that says what we were looking for!

It's as simple as that sometimes.

Case study 14.05 - The Good Neighbors to the Vacationers

The Faraday Resort Village on the outskirts of Faraday, Michigan, was expanding. Not just a few rooms and a new sauna, but an honest-to-goodness full scale resort expansion of 200 new rooms and all the related amenities. The owner, Toona Dole, was a good businesswoman and she was always especially careful to take care of her resort guests so they came back time and time again.

The expansion was a great event for her. It was her first major construction program since she had assumed control of the family owned business ten years ago. She had retained a youthful but enthusiastic local design firm, Wiggins and

Loi to prepare the contract documents for the expansion. Laura Wiggins, the architect/engineer of record was about ready to begin preparing full working drawings and specifications. All design development work had been approved and Miss Wiggins had recommended that as the construction documents were being prepared construction should overlap. She estimated that foundations could start in about a month. This delivery system would require awarding an early construction agreement to a general contractor and some of the early subcontractors

While talking to Laura, Toona suddenly remembered a visit she had paid to an early construction conference for work to be done on a hotel and restaurant expansion in the nearby town of Dunbaer. The firms participating in that project had assigned their best superintendents, foremen, and tradesmen to the work because the owner (a good friend of Lorna's) paid well and promptly for good work. The meeting was for the purpose of writing a partnering charter and the charter turned out to be a key element in keeping the existing facility in business during the expansion.

Good housekeeping was a major objective built into the partnering charter by the project participants. The contractor's constant concern for customers using the facilities and for maintaining the ongoing business operations while the facilities were being renovated and built all kept a steady flow of business coming during construction. All of the elements Toona Dole felt strongly about in her business life seemed to all be present in the partnering system she had seen at work on the Dunbaer project.

So, when the opportunity to partner on her new project appeared she jumped at the chance. First, she negotiated a contract with the general contractor who had worked on her friend's project. This, she explained to him, was because he had

done such a good job of construction and of community and guest relations in Dunbaer. Next, she requested he use the same subcontractors he had used in Dunbaer if it was at all possible. Lorna felt that having worked together and performed so well that they might just have the same chemistry going on her job.

And, lastly, she requested the general contractor establish and implement a partnering system on the Faraday expansion. Toona had some ambitious plans for the future of her Faraday resort and she wanted her financing team and business partners to see how her projects were initiated, planned, designed and built. What better way than to have them sit through a partnering session and see and hear the people who were actually going to design and build the project.

The partnering session went well with the general contractor, his few early subcontractors, some of the long lead time equipment suppliers, the design team, and Toona and her business guests. The stakeholders wrote a good charter stressing the need for over-and-above care for the users of the Faraday Resort. The stakeholders were invited to a social hour after the charter meeting, a dinner on Toona, and a free night's lodging for the stakeholders and their families at the Resort.

To make a long story short but happy, the job turned out well, was built around the existing buildings, and guests hardly knew a construction program was in work. The work came in on time and right on budget. Already the other projects Toona had in mind are on Laura's drawing board and the entire construction team for Faraday are gearing up for a good season of construction.

The moral commitments people make as part of their business contracts do work. They impress clients who do business the same way. For the Faraday jobs,

the whole successful affair started because a bunch of construction people agreed with their client that people on vacation should be allowed to enjoy their vacation.

Problem #6 - Timely action - appears 467 times - 16% of total

Timely action is a catch-all phrase that must be reduced to specifics if its benefits are to be fully realized. Fully understanding what timely action means and how to take it is absolutely essential to good management of generic construction. Timely action can mean early, as needed, or late action, and it can also concern the duration of the action. Sometimes a delay in doing something can be considered timely action. For instance, if the design team needs three more days to devise a solution to a nasty traffic problem in a company parking lot and their study cannot be used until the contractor completes its cost estimate of the site grading and mass excavation in two weeks, timely action may consist of allowing the design team the additional time to improve their work product.

The application of network modeling and critical path analysis is an excellent method to help make better time-related decisions. A good critical path diagram allows the manager to immediately see how much discretionary management or float time is available to each activity. Float time is the number of time units available after subtracting the early start from the late start of an activity. It is the amount of time over and above the estimated duration of an activity that the manager actually has in which to complete the action. Proper use of float time can be considered taking timely action if it adds value to the action.

The current phase of a job along the line of action¹² is also a critical determinant in determining if an action is timely or not. If the project team is attempting to

¹² See Chapter 2, Section A for a discussion of the line of action. Also see Chapter 8, Section B for a detailed description of the elements of the line of action.

improve the quality of a to-be-built building the members are best advised to determine how that quality is to be achieved while the project is in the program or design period where the expenditures for experimenting, analyzing, testing, and other small scale simulations are relatively small. Testing the floor wear characteristics of a new laminated material is best done on a small scale in the program or early design period. Testing the material by actually installing it in the building may risk sizable amounts of money in a gamble that could fail at an untimely moment.

Perhaps the case of the untested pavers might best illustrate the concept of timeliness in the construction process.

Case Study 14.06 - The Untimely Paver Action

Tom Whitney, Bob Tulk, and Larry Allen were conferring about the landscaping, site work, and sidewalks that were to surround the new performing arts center in Marias Bay, New York. Marias Bay was a far north community with a climate more suited to polar bears than music lovers. The town had somehow generated a reputation for presenting unique and well-done musical presentations from jazz to opera. Its musical efforts were well rewarded when the citizens of Marias Bay voted in a large revenue bond issue to build a performing arts center. Tom, Bob, and Larry were part of the architectural engineering team from TBL Associates, the designer of record, that had been working over a year on the project, and was now getting the final working drawings and specifications ready for issue.

At the beginning of the program and design work the Marias Bay Performing Arts Authority, the client, had decided to use partnering on the project. The Authority board had held a partnering meeting at the beginning of the schematic

design phase, and had invited the program writer, the Authority project manager, the project leaders from the architect and engineering offices, and the operating staff of the present Music Hall which was being replaced by the new Performing Arts Center.

At this early partnering meeting the stakeholders decided to do all their value engineering up front during design and they recommended a construction advisor be retained for the value engineering work. The Authority, with the help of the design team, selected a good local contractor who had been active in value engineering in the region for about fifteen years. Bryan Construction Engineers, the firm that was selected, has a staff of registered professionals working full time with owners, architects and engineers. Their job: to add value to projects by intelligent, thorough, up-front cost/value analyses.

One of the first value engineering areas studied was the exposed surfaces of the project. Marias Bay winters were long and harsh. Because of this the Bryan staff recommended many different materials giving the Authority and TBL Associates a wide range of choices. TBL had acted on most of these, but for some reason, the design team had missed making a final selection of site sidewalk pavers.

There was nearly a mile of exterior walks on the Performing Arts site and Bryan had recommended three paver types from which the final selection should be made. All three, in their opinion, would easily survive the summer rains, the freezing and thawing temperatures, and the havoc wreaked by snow plows and brushes after the heavy winter snowfalls.

TBL's late selection was the first of the untimely paver actions on the project. The next was the final forced selection of one of the three that turned out during the

bidding period to have a manufacturing and delivery lead time for production that would bring them to the job, under normal conditions, at least two months after they were needed.

So a paver selection decision was deferred and TBL and the owner issued a prebid addendum including exterior pavers as an allowance. Hard money bids were received, a single general contractor was selected, he submitted his subcontractor list, it was approved, subcontracts were awarded (except for pavers), and the job began.

The Authority held a construction project partnering meeting as field work began, and among the problem statements was the paver reminder from the general contractor--we need a paver selection now! This time TBL responded and an intensive crash-selection process ensued. Tom, Bob, and Larry met with the selected general contractor project manager. He reviewed Bryan's earlier recommendations, concurred with the choices and added that he knew the second choice paver was available by the time they were needed. He had just come from a job three hundred miles further north where that very tile had been used.

Tom, Bob, and Larry got on the phone with the superintendent and confirmed that the tile was available. They also found that they were going to have to pay twice what was budgeted for the tile to get it when they needed it. However, by this time a decision was essential and the options of economy and choice had forced an imperative solution that was less suitable than desired.

Several observations can be made from this case that demonstrate the need in the planning, design, and construction business for timely action.

1. Delays in selecting key materials located at critical points on a project will almost always force a less-than-desirable course of action to be followed.
2. During the up-front design period large amounts of money are committed but actual cash expenditures are usually small--normally less than ten percent of the total project cost. Therefore simulation, experimentation, and testing should be done up-front before construction starts in the field.
3. Use partnering to identify weak spots in the job at all phases. The mission and problem statements almost always will pinpoint where lack of timely action is most likely to cause job trouble.
4. Don't delay making decisions just because you think you have a lot of time to make the decision. Remember, there are usually a lot of things that must be done and that also take time to do after you have made up your mind.

Problem #7 - Planning and scheduling - appears 396 times - 14% of total

Planning and scheduling of design and construction work has become very complex over the past forty-five years. Many factors have contributed to the increased use of higher levels of planning and scheduling. One of these is the many advantages a design and construction project gains from good planning. Competent planning and scheduling provides:

- an accurate simulation model of the project by which office and field decisions can be tested before the project moves into actual implementation;
- an early statement of intent by which the project team sets the conditions under which the project is being designed and built;

- encouragement to maintain good communications on the project.
Communication with others, as we saw above, was one of the most common problem encountered on design and construction projects, receiving 34 percent of the mentions of problem statements in twenty-three charter meetings.
- one of the major tools by which project chronological sequencing progress can be measured and used as a management-by-exception tool.
- a method by which the performance of the project team can be accurately evaluated.
- an accurate and invaluable project history if the project plan is used in conjunction with a valid project monitoring system.
- a reliable method by which others with a stake in the project can be apprised by the project staff of the actual status and resource use of the project.

It is little wonder that planning and scheduling plays such an important role in the minds of all those who are at-risk on a project. The absence of a good plan or schedule invariably alerts those involved in a project that they must be careful about the job. It signals that they should be thinking about how they can individually show their intent and the conditions under which they are working. Further, a good design and construction professional knows that planning and scheduling is a major responsibility of the manager.

Case Study 14.07 - Difficulties on the Clark Campus

Clark County has been the fortunate recipient of a private financial grant to

remodel an existing building on the urban campus of Clark Technical College. CTC has about 15,000 students and is literally the educational hub of a farm belt covering three contiguous states, one of which contains the College. The mechanical engineering curriculum at Clark is unusually strong and Clark graduates are in demand all over the world. Especially strong is their knowledge of farm machinery, crop sciences, and rural hydrology.

Clark has constructed seven buildings ranging in cost from five to forty million dollars built during the past ten years. The new project is a testing facility and classroom costing twenty-five million dollars. The grant for the project has been hard earned from a local foundation, the Harvester, established many years ago by a wealthy farmer, Wayne Larkin. Early in his life Mr. Larkin placed much of his money in the foundation. Harvester has been instrumental in funding four of the seven facilities and has always required that the projects they help fund stimulate good relations between the farm community and the other parts of the regional economic system. They also strongly encourage the use of positive personal interaction techniques developed by local business and trade associations to maintain a high level of performance on Clark College's campus projects.

The new Larkin Testing Laboratory is a complex building, designed to help teach the most up-to-date destructive and non-destructive testing methods known throughout the world. The design is intricate enough so that the owner, the Harvester Foundation, and the user, Clark College have brought together a team of planners, architects, engineers, testing experts, and constructors to work as a team on the program and to design the building.

The program manager for the total job is George Stanford, a bright young agricultural engineering graduate of Clark who is employed by the Harvester

Foundation to oversee all capital assets in which Harvester has a financial or operating stake. Mr. Stanford worked for an engineering design firm for about five years after graduation from Clark. He spent the next five years with a general contractor with operations in the United States, England, and France. This contractor was a design-build firm specializing in farm-related manufacturing facilities.

After ten years of design experience, travel, and construction site operations, George Stanford was ready for Harvester. He joined the foundation four years ago and quickly built a reputation for being innovative, competent, honest, and fair that has now brought him into the higher middle management of his employer's organization.

One of the soft areas of design and construction that has impressed George over the past ten years is the use of partnering in front end program and design work, followed later by its application to field construction. He has used partnering charters several times and feels it could be invaluable on this job. However, he does not quite see how it can benefit the team effort until the active design process begins. Currently the project team is still writing the program. So, he has held off suggesting a partnering effort at this early stage.

In the early parts of their work, members of the project program and design team, a group of hand-picked key people from each organization, have been doing considerable individual research. This keeps their efforts highly compartmentalized without a great deal of interaction among the team members. However, there are now increasing needs and pressures for full-team conferences as the data collected are put into program form.

Some inevitable frictions have appeared among the data collectors, the designers,

the testers, the users, and the builders. So far nothing specific has caused much trouble. However, it is obvious that the construction group has about all the information they need to start their early *proforma* estimates of equipment, materials, and labor required for the project. The testing people could go on collecting information forever. The designers are ready to translate the data everyone has into graphic models. The users are getting itchy about the need to get some hard understandable information about the new building.

George has been depending on Tom Trainor, the contractor representative on the team, for planning and scheduling the team's work to date. However, Tom has obviously reached his planning and scheduling outer limit and is having trouble drawing the loose ends together so the team members know with certainty where they stand on the project. Also, Tom, though competent, willing, and personable, is the builder presence on the team and is viewed with mild suspicion by both the design group and the testers.

By now many of the team members have heard about partnering from a variety of sources. Lyle Claiborne, the architectural designer has been told by his professional liability insurance representative that he is missing out on considerably lowered premiums project-by-project by not specifying partnering. Tom Trainor's, employer, Trent Construction is using project partnering on three jobs currently. All are running well and Tom has become a partnering advocate.

The Clark College dean of engineering and his boss, the Clark president, are interested in anything that will keep the project moving. Particularly attractive is that Clark College and the Harvester Foundation have both learned from Lyle Claiborne's insurance company that partnering could reduce the cost of any additional liability insurance if they use his firm to design the project.

Clark's president has seen some of Clairbourne's early work on the new building and liked what he saw. It has been excellent despite the frustrations and apparent delays to starting full design development. He wants to use the firm as the architect/engineer of record. Claiborne Associates Ltd., however cannot afford to carry the amount of insurance deemed advisable by Clark College and the Harvester. So, the college or the foundation might have to pick up a substantial portion of the extra coverage.

All things being considered--minor frictions, a few scheduling dysfunctions, some impatience among the engineering faculty, and the inquisitive nature of the program and design team--George Stanford thinks it's time to call for a partnering charter meeting. He wants to build a solid foundation for future team design and construction efforts on the project while there is partnering enthusiasm.

The partnering charter meeting brought together a few key members of the Clark engineering faculty, the original team members, and a few additional players from the design firm who would soon be starting active schematic and design development work. The two program writers from Claiborne Associates were also present at the charter meeting since their work overlaps and connects to nearly every step in the design process.

During the partnering session one of the much discussed problems was that of planning and scheduling and how to do it. The major subject of the discussions was about how to plan the up-front program and design work, and who was to do the planning and scheduling. Tom Trainor candidly admitted he did not have the skills to plan and schedule such a complex program; his abilities, he said, were in estimating, constructibility, materials, and structures. He added he was a good construction planner and scheduler but that this early planning was out of

his league. None of the others present volunteered their services since they were all technical and design specialists with very little management and programming planning backgrounds.

So, the charter objective dealing with planning and scheduling, that was adopted read:

Charter objective 05 - We, the Clark programming and design stakeholders, commit ourselves to:

- A. Work cooperatively with a competent professional planning and scheduling consultant to be retained by the Harvester Foundation
- B. Help prepare, publish, and regularly update a network model showing activities through the programming and design stages needed to produce the full set of construction documents for the project.
- C. Help prepare and publish accurate short-term work plans and schedules.
- D. Assist Harvester to monitor and report regularly on project progress.
- E. Help train and coach key stakeholders to prepare, use, and update effective design and construction planning and scheduling methods for the remainder of the project.
- F. Honor schedule commitments and deadlines, and to accept responsibility for meeting deadlines.

Twenty people attended the all-day charter-writing session and all stayed on to sign the charter. They each received a beautiful scale model of a farm tractor as their memento of the meeting and were suitably impressed by its quality and attention to detail. A social hour hosted by Clark's president capped off the hard-working day and did much to provide the celebration so essential to successful partnering milestones.

Soon after the charter meeting the partnering evaluation task force met and produced an excellent charter monitoring system. Concurrently,, George Perry, Lyle Claiborne, and Tom Trainor selected an expert network modeler, Jessica Conover, who had coincidentally worked for all of them on past projects and who was very familiar with innovative methods of effectively planning for the full range of line-of-action tasks from project concept to facility turnover. Jessica began her work immediately and by the time the partnering evaluation system was in place she had produced a first draft of the network model up through the issue of the early construction document bidding packages.

The timing of the charter monitorings and the project progress monitorings was such that the project was able to be thoroughly reviewed each three weeks both from the noncontract aspect of the charter provisions, and with respect to the contract requirements for each of the stakeholders.

It wasn't long before the program writers were working to specific, well-defined sequence and time objectives set by them with Jessica as she prepared the network model. The model also provided the architects and engineers with authentic dates by which they could begin their schematic design studies. The program and design dates in the network model gave the construction consultant the dates he needed to begin progressive estimating. It also allowed him to start aligning the cost targets of the program with the actual construction

costs anticipated by the schematics.

The stakeholders, project-wide, began to feel more comfortable with their work and the work of others through the improved communications stimulated by competent project planning, scheduling, and monitoring. This aspect of job management was also assured of use in subsequent job and partnering stages.

Problem #8 - Organization, authority, and responsibility - appears 371 times - 13% of the total.

One of the most frequent causes of low employee morale and high turnover has consistently been cited as being organizational confusion. Usually this problem is coupled to an expressed lack of knowledge by employees of their duties, responsibilities, and authority. Poor definition of employees' positions can also lead to faulty decision-making, creating gaps in the informational chain, and preventing prompt and helpful resolution of disputes and conflict.

In partnering charter meetings lack of well defined organizational structure, fuzzy lines of project-related authority and responsibility, and obscure communications paths are mentioned as causes for concern to almost every individual, discipline, and organization. Most attempts to improve clarity and effectiveness of project management applications are concentrated on sharpening the focus at all levels of management on organizational relationships. The Metroplex Airport project is only one example of how relatively simple measures can often produce results of great benefit to the project participants.

Case Study 14.08 - The Metroplex International Airport Complex

Metroplex is a bustling urban complex of more than four million people living in five moderately sized, politically autonomous communities. Metroplex is currently remodeling and renovating its entire airport facility. The budget for the project remodeling, extending over ten years, is nearly 300 million dollars.

The Metroplex Airport Authority is the organizational structure created to plan, design, construct, and operate the airport. It is composed of a large and, for the most part, competent managerial staff concerned with all aspects of airport operations. Included in the expansion program are several key people who are just beginning to find their positions in the project chain of organization, command, and responsibility. The complexity of the relationships on the project is increasing by leaps and bounds as more and more people join the project team. At present some of the key managers involved include:

- Linton Fredricks - Director of Metroplex Airport Authority.
- Albert Yardley - Director of Airport Operations.
- Aileen Lindell - Design and construction project manager for the Authority.
- Ron Carrolton - Project manager for Tinzal Construction, the at-risk construction manager firm.¹³
- Lars Kunzel - Project manager for Lincoln and Associates - architects of record.
- Tom Prince - Director of Airport Security.
- Lena Warren - Airport Properties and Leasing Manager.

Many others are being involved as the project moves through various stages of planning, design, and construction. Project work is now in phase one of eight major design and construction phases. Phase one design has been completed, the construction manager Tinzal Construction, has taken proposals for all phase one

¹³ An at-risk construction manager is a consultant and contractor who is, or ultimately will be, liable for the cost of the work on which it is engaged.

work, and seventy percent of the construction cost contracts have been awarded for phase one construction.

The management team has decided that it should attempt to implement a staged project partnering effort and has just held its first charter writing session. Charter objective number one stipulated that the organizational structure and the chain of command should be clarified, identified, and published. The adopted charter provision dealing with organization, authority, and responsibility reads as follows:

“Charter objective 01 - The stakeholders will maintain effective communications on the project by:

- a. Conducting project briefings for each phase with impacted parties.
- b. Preparing and publishing a project chart showing project communications flow, responsibilities, and authority.
- c. Preparing and publishing an organization chart showing the organizational relationships among the stakeholders.”

During the charter meeting when the subject of organization and authority came up the Airport Director, Linton Fredericks, asked who among the stakeholders was best equipped to prepare a chart showing the information required. To his surprise the staff members attending recommended that Mr. Fredericks himself prepare the charts in conjunction with a task force of volunteer help. The stakeholders felt Mr. Fredericks was the only individual who really knew what everyone was supposed to be doing.

After the charter meeting Mr. Fredericks asked Al Yardley of airport operations, Aileen Lindell, Metroplex’s project manager, Lars Kunzel, architectural project manager, and Ron Carrollton, project manager for Tintel, the construction managers, to meet with him tomorrow to review the stakeholder’s request.

The next day, the task force was assembled in the large airport conference room where Mr. Fredericks outlined a suggested agenda for the group. “The main item of our work” he said, “was to determine what it was the stakeholders wanted done.” Then, he added, the task force could work most effectively at how to best do it.

After considerable discussion, Aileen suggested the most important element for her to understand was what she was expected to do by each of the people on the job. Of equal interest to her was how to communicate to the other stakeholders what it was she expected of them in their work with her.

Aileen illustrated her ideas by a sketch on a flip chart of what interrelations might exist between her and Linton Fredericks. The matrix chart looked like this:

	<u>Linton</u>	<u>Aileen</u>
<u>Linton</u>	----	(a description of what Linton expects from Aileen in her job as it affects her)
<u>Aileen</u>	(a description of what Aileen expects from Linton in his job as it affects her)	----

Task force members liked the idea of the dual expectations, and decided to put each of their relations with the others into a matrix form like show below. Since they didn't know yet what would go in the chart they numbered the spaces in which the interrelational descriptions were to be put. The matrix chart included the numbers from one to twenty in parentheses, and is shown below:

	<u>Linton</u>	<u>Al</u>	<u>Aileen</u>	<u>Lars</u>	<u>Ron</u>
Linton	----	(05)	(09)	(13)	(17)
Al	(01)	----	(10)	(14)	(18)
Aileen	(02)	(06)	----	(15)	(19)
Lars	(03)	(07)	(11)	----	(20)
Ron	(04)	(08)	(12)	(16)	----

The task force next began defining the text that fitted each numbered space in the matrix, remembering that the vertical columns represent what the individual named at the head of that column expects from the individuals named on each horizontal line. To begin the process, Linton Fredricks asked all of the task force members what they expected of him in doing their jobs on the airport improvement program. The individual responses were placed in spaces (01), (02), (03), and (04). Responses were quick to come and are listed below.

Linton Fredericks is expected...

- Space (01) - By Al Yardley "to provide management and resource support for mutually agreed on program work."
- Space (02) - By Aileen Lindell "to funnel his management requirements to her through Al Yardley, and to be available when needed."

- Space (03) - By Ron Carrolton "to support agreed-upon recommendations at all higher management levels."
- Space (04) - By Lars Kunzel "to inform the design team of his design requirements through Al Yardley, and to support approved design concepts in his work with the Authority."

This went so well Mr. Fredricks requested they continue the process and let him tell them what he expected of them. The stakeholders agreed. These responses were what would appear in spaces (05), (09), (13), and (17).

- Space (05) - Of Al Yardley "to manage the total airport expansion to completion within the design program and mission, to which the Authority, and its management have agreed."
- Space (09) - Of Aileen Lindell "to manage the expansion at the project level so the program and mission is achieved, and to keep him informed through Al Yardley."
- Space (13) - Of Ron Carrolton "to manage construction operations so the program and mission is achieved, and to keep him and the Authority informed through Aileen Lindell."
- Space (17) - Of Lars Kunzel "to design the new and remodeled airport facilities so the program and mission are achieved, and to keep him and the Authority informed through Aileen Lindell."

The experimental process of determining what the five members of the task

force expected of each other brought out many important points in the management of the job at various levels. One of the more significant was that, in the organizational structure, Mr. Fredricks would be available to stakeholders as they needed him. However, he wants to manage this program primarily through the efforts of Mr. Yardley and Aileen Lindell. This management desire conveyed a clear message to Ron Carrolton and Lars Kunzel--"work through Aileen and Albert--don't come to me with any micro problems until you've talked through them."

The task force meeting went so well that Mr. Fredericks asked the group to immediately implement the program with the full complement of thirty-five stakeholders who attended the charter meeting and signed the charter. The organizational matrix resulting provided a springboard for several other organizational innovations on the project. It also gave the stakeholders a good working insight into the total management structure of the Airport Authority, and helped them manage on a need-to-know basis.

Charter objective 01 consistently received high marks in the monthly partnering evaluations, and was considered by most stakeholders to be a major factor in the successful completion of Phase One.

Recommendation Number One - Manage the project as if all team members are working toward the same project end objectives. Stakeholders may have different methods of working, different trades to install, different styles of managing, but they all must be playing the same music, and must all end up together, and in tune.

The examples management sets on a design and construction project are often reflected in the actions of those being managed. If the owner fails to attend job meetings regularly, the architect and engineer might rightly or wrongly feel they are entitled to follow the same management mode - indifference. If a prime general contractor sends third and fourth tier managers to the construction meetings, he can expect his subcontractors will do the same.

Recommendation Number Two - Set a good example for other managers on your project. Understand which duties and tasks require your active participation to move the project in the direction you and the others have set as essential and desired. Then give the full measure of your skill and abilities to their accomplishment.

Failing to take responsibility for our actions has become a common management deficiency, seen most frequently in projects that drift aimlessly, without any apparent leadership. Reluctance to make critical decisions, or to be frightened of risks that must be taken or rejected are managerial missteps that create severe hardships for others. They often subject subordinates or other low tier managers to unfair situations that the lead manager should have resolved. This destroys confidence and weakens leadership.

Recommendation Number Three - If it is your job to do it, do it! If you must take an action without having the authority and it is crucial to the project, take the action

and stand the consequences. Needed actions taken by discerning managers, exercising sound judgment, will usually have positive consequential outcomes.

Consistent exercise of good management policies and principles will allow those being managed to know where they stand most times and under most conditions. Confusion of communication, lack of adequate leadership, and vacillating direction will destroy the ability and the will of those being managed to follow and to work effectively.

"A foolish consistency is the hobgoblin of little minds....."

Ralph Waldo Emerson

Recommendation Number Four - Exercise intelligent, consistent decision-making, tempered with good judgment, and empathy for others; and then insure your decisions are clearly communicated to those people who must do the work, and that they do the work.

The excellent manager must learn how to make good decisions. There are a variety of different methods available to help make decisions. Once these are learned, decision making becomes an art in which the data, the risks, the pros, the cons, the action alternatives all become a colorful and integral part of the total picture.

Recommendation Number Five - Position your home base mental working platform within the project macro boundary, making certain it provides you a view of the entire program and project. Then learn to mentally move comfortably away

from the platform to the outer project boundaries for macro viewing, and to zoom back from the macro position for a micro view. From these macro and micro journeys you must be able to quickly and easily return to your home base mental working platform.

Many problem comments made in partnering meetings concern the scale of management efforts rather than a lack of quality. The good manager must be able to expand his or her view beyond the immediate situational boundaries and yet return to the normal mental working location with ease. Moving easily from the macro to the micro and being able to stop anywhere in between helps insure the manager viewing the scene gets a full look at what's going on in and around the situation. Such an ability, intelligently applied, will usually keep a good leader from becoming either a generalist or a myopic micro manager.

Recommendation Number Six - Plan well, know what your plan says, know what the product of every action in your plan is supposed to produce, and then decide how to lead others through your plan while allowing them to accomplish what they want and need to be successful.

One of the most important functions of design and construction managers is to see that the project is properly planned and scheduled. In the case of lead managers responsible for the work of their own staff and of others who are working under them, provision of effective planning and scheduling becomes a necessity. Time after time in partnering workshops stakeholders say that lead contractors do not maintain the schedules; or that the design team does not adhere to its approval commitments in accordance with agreed-to submittal dates shown in the contractor's schedules; or that the subcontractors fall down in their adherence to an agreed-to delivery dates shown in the schedule. Planning is

not incidental to good management--it is an essential ingredient of good management.

Recommendation Number Seven - Listen well and be certain to understand what other people are saying, thinking, and doing that affects your work and your management of that work.

Often we are so enthusiastic in what we are saying and so confident of its accuracy that we fail to understand the view others might have of these management basis from which we direct our work. The perceptions of others, particularly those experienced in generic construction, and knowledgeable about its management and execution may be able to bring insight and resolution if we will only listen to them patiently and with genuine interest.

Listen to those who advise--listen with ears that hear, hearts that have understanding, and minds that know how to be discerning--but listen!

The clearsighted do not rule the world, but they sustain and console it.
— Agnes Repplier

Recommendation Number Eight - Avoid using emotional words when writing or talking about management situations in which different people with different viewpoints must interact. Emotional words are often interpreted differently by different people. If misunderstood they can cause trouble.

When emotional words such as hate, love, prejudice, stubborn, uncaring, stupid or other similar nouns, verbs, and adjectives are used incorrectly, intentionally or accidentally, and are misunderstood, the reaction can seriously injure

normally clear communication lines. Language effectiveness, like action effectiveness, depends to a great extent on the intent of both the sender and the perception of the receiver being in tune with each other.

Emotional words are used to convey subjective feelings of a speaker or writer and are of a nature that, if stated in an objective, and unbiased manner, would most of the time convey little or none of the speaker's or writer's emotional entanglement with the words. Choose your words carefully, and--if you have doubts as to whether you should use an emotional word or phrase--don't!

Recommendation Number Nine - Remember the worlds we live in - we live in a world of words when we speak, write, or draw. We live in a world of nonwords when we act. When your nonword world successfully matches your world of words you can be said to have planned and simulated well.

Many of the construction professional's working hours are spent in the world of words. If we fail to convey the meaning of words and phrases produced in this world of words the potential value of the simulations and modeling done through them disappears.

Recommendation Number Ten - If there exists a possibility that abatement of any type for any materials whatsoever may be required, be certain to clearly define what work is liable to be affected by taking or not taking abatement action, what is to be done, where is the work to take place, when it is to be done, how is it to be accomplished, who is to do it, and who is to certify that the work is complete.

Job problems caused by the need for abatement are so numerous and some are so disastrous that singling out any for praise or criticism is impossible. I have found

the most frequent causes for regulatory confusion on projects is failure to clearly define the conditions surrounding the situation. When you properly answer the six classic questions--what, where, when, how, why, and who?--you are well on your way to resolving an abatement problem.

Recommendation Number Eleven - Submit properly prepared pay requests at the time required, in the format specified, and to the proper parties.

Prompt payment in the design and construction business is a lifeline of strength that can preserve the vigor and integrity of a project, or if ignored can cast the project adrift. The payment process is a two way street--to be paid properly you must request payment properly. For instance, in a recent charter meeting a subcontractor was heard to complain to the general contractor project manager about slow approval of his latest pay request. The project manager responded saying "that pay request of yours was just submitted a few days ago, and it is not in the format required by the owner. We can't process it."

Recommendation Number Twelve - Learn to appreciate the importance and complexity of closing out your job quickly and cleanly. Then go to work and learn how.

Closing out a job is very difficult. It is like trying to get rid of a piece of sticky flypaper or a scrap piece of mending tape. The importance of closing out properly is indicated by the number of mentions in charter preparation--111 times in 2,855 problem statements.

The owner, architect, engineer, and contractor should all prepare their own check list of close out items to do. It should cover such subjects as certificates of

completion and occupancy, punch out procedures, operating and maintenance manuals, training, construction record documents and dozens more. Time spent early in the job on planning how to close it out will pay large dividends.

Recommendation Number Thirteen - List the submittals you know that you and others who affect your work will have to prepare on the job. Then develop a system of insuring that these submittals are prepared, tracked, and acted on promptly and fairly.

Submittals can include shop drawings, manufacturer's cuts, samples, mock ups, test reports, and other documents containing critical information about materials, equipment, and systems that are important to maintaining job progress. Providing such submittals is only the first step but it is a critical one. If the architect doesn't have the hollow metal shop drawings he or she cannot approve them. Like most other problem actions "it takes two to tango." Stay current on your submittals.

Recommendation Number Fourteen - Know what submittals you are going to get, know what you have to do with them to keep the project running well, then do it!

This is the corollary to recommendation thirteen. The progress of most projects depends on getting shop drawings submitted and received back promptly. Delay in approval of properly prepared and accurate submittals is inexcusable. It can easily cause cost overruns, schedule disruptions, loss of confidence by the submitting party, and severe disagreements that could lead to destructive conflict. Work hard at processing submittals. Many organizations have made their reputations by being good at this.

Recommendation Number Fifteen - Consider the utility companies, the building departments, the zoning boards, the health departments, the fire marshals and all the other public and quasi-public regulatory organizations as important participants in your project. They can help you get the job done.

Occasionally project participants consider others on the job as either friends or enemies. In conflicts or arguments it is often "we" and "they" who are involved. The appearance of this sharp division almost always signals management deficiencies that if not corrected will lead to a decline in project staff effectiveness. Developing a team spirit to reach plan objectives depends on getting rid of we--they attitudes.

An example of we--they thinking can often be seen when design and construction practitioners fight with public agencies charged with protecting public health, welfare, and safety. A resulting request heard when the occasional public or utility official is invited to a partnering charter meeting is that stakeholders treat the official as a member of the project team. This request has considerable merit since the regulations will usually be enforced, whether or not you agree with them. If the rules are reasonable and you are not, you will probably lose whatever argument you might have. Try to make the public officials who regulate your job a friend, not an enemy.

Recommendation Number Sixteen - Educate and train your staff in the principles and basic ingredients of partnering.

Partnering is more of a way of thinking than it is a technique or methodology. The commitment of stakeholders as they write a partnering charter is to use their already acquired skills in a better manner than is usual. This is possible in a

partnering arrangement only because the other stakeholders have agreed to try to do the same thing. They all risk exposing areas of uncertainty and vulnerability. The mutual agreement to improve protects them.

Educating and training your staff members in partnering is mainly getting them to understand why the technique is important to them and their organization. When that is understood you can then teach them the methods of preparing a charter, of resolving issues, and of evaluating performance.

Recommendation Number Seventeen - Take the charter mission and objectives seriously and work hard to achieve both.

The charter is the fundamental document that signifies a moral agreement exists between and among the stakeholders. It is a document that requires hours of discussion, argument, evaluation, decision making and culminates in a serious commitment that is not to be taken lightly. Once a stakeholder demonstrates that he or she is not going to abide by the charter the spark of spirit that is so vital to a partnering effort is extinguished. If commitment is high among the other stakeholders those who give it lip service only are liable to find themselves working in a vacuum.

*Success depends on two things - finding the right people
and being the right person.*

Recommendation Number Eighteen - The partnering system gives you a wonderful opportunity to set a good example to industry newcomers by displaying the talents you have. Show your best abilities with the intent that what the freshmen learn from you will benefit the design and construction profession.

Most experienced professionals in the building business are always looking for ways by which they can make a positive contribution to their industry. We see this in the amount of time the active participants spend in working in their professional and trade associations. Partnering has provided another window of opportunity to coach and mentor young and upcoming project managers, tradesmen, and superintendents in how teamwork pays off on the job. Teaching others, as it always has, gives the instructor as much or more benefit as is gained by the student. The partnering effort is a training and educating opportunity that benefits all the stakeholders and their organizations. Use it to help others.

Knowledge exists to be imparted.

— Ralph Waldo Emerson

Recommendation Number Nineteen - Use the “one to ten” method to measure problems, situations, opportunities, performance, change, and the myriad other things that surround us and make us successful or doom us to failure. Get in the habit of considering ten as the best and one as the worse. Then make your evaluations and base your actions on improving in increments, not all at once. You’ll have more fun becoming successful and the people you work with will appreciate your increased tolerance for their efforts to succeed.

So often in the world of sum-zero games such as baseball, hockey, politics, and hard money bidding we find you either win or you lose. Wise people know that there are always tempering shades of gray in between the losing and the winning. Partnering helps us find these middle grounds, the two’s through the nine’s, that mark most of our actions. The system then works to bring the extremes up or down to a compromise that benefits all participants--that

prevents the overreaction of one or two views from destroying hope of resolution. Use the "one to ten" method, not the one or ten attitude.

Recommendation Number Twenty - Be available to those who depend upon you for your advice, help, decisions, and leadership.

Being available is one of the most critical attributes of good leaders and excellent managers. After all, the reason a leader or manager exists is so those being led or managed can benefit from their visibility and availability. Proper delegation, attention to a suitable span of control, and the scale of the situation (remember the "one to ten" method) enters into a decision about just how available you must be. However, most good professionals just seem to be where they are needed when they are needed. This is more than an accident: it's people skills at work. Be available.

Recommendation Number Twenty One - Start out a project by believing that others on the job want to do well. Next, consider the fact that if you don't care who gets the credit you can accomplish anything. Last, determine that you are going to help people do well and accomplish all that you and they wish to accomplish. If you have done these three things you are one third the way to project success.

People are full of surprises. Recently, a project with a tough time schedule seemed hopelessly behind. There were only three months to go and the general's superintendent, Frank, did not really believe he was going to complete on time. Only three months earlier the job had been a model job.

Frank had said at the project kick off partnering meeting that he was looking to partnering as providing a positive tool to help improve job performance. What

had happened? His boss, a wise man, suggested he get the project stakeholders together and see what suggestions they had to bring the project back in line. Frank did.

The stakeholders were gratified to be consulted--they wanted the job to be successful. They also made it clear that the real problem was poor scheduling, inadequately monitored. Frank got the message, assembled a blue ribbon planning group from the stakeholders, and they quickly revised the schedule of remaining operations to suit what had to be done. Now Frank's boss stepped back in--"Frank, he said, "remember, you and your people are also committed. You also have to abide by this schedule if it is to be successfully used." It worked--the job was successfully completed on time and at an acceptable cost.

...Three things help you to succeed--people who want to do well, unclaimed credit, and helping others succeed.

Recommendation Number Twenty Two - Keep the job clean and the site well organized.

Working on the site day-after-day and being constantly barraged with problems that threaten progress and costs, many field managers give up on trying to keep their jobs clean and well planned. Many years of field monitoring experience have proven to me that in most cases, good housekeeping almost invariably signals good field management.

Clean up becomes a problem only when a working resident of the site doesn't choose to do it. Failure to clean up then becomes a matter of poor management and deficient leadership. Both of these qualities are usually found to cause other

disruptive job problems such as poor scheduling, cost overruns, careless paperwork, and a multitude of other problems. These other problems are not so easy to see as a well-kept job site, but rest assured they are probably there if the site is a mess. A clean job is a valuable asset.

"Penny-wise. Pound-foolish."

Ben Franklin

*"A penny will hide the biggest star in the universe if you
hold it close enough to your eye."*

Samuel Grafton

Recommendation Number Twenty Three - Try to keep good trades managers and journeymen on the job until their work is finished. Do this by making them want to stay on your project.

All too often a contractor's home office will pull one of its key managers or journeymen off a project as it begins to wind down. This practice is disruptive, even though the reasons for it are valid. Good people, it appears, are more valuable to start up a new job than to finish an old. Conventional wisdom may be faulty when the new management and trades crews have to do a quick-learn on the job. This often is done after the original group has left and frequently occurs during the closing out of the project. That means the finishing touches are often make-dos, not a crowning achievement.

Recently a little squib in a trade paper made a statement about paying attention to closing out. It said that close out must begin at the 85 percent point in the job because the last 5 percent of project work takes 15 percent of the total job effort to

complete successfully. The actual numbers may be difficult to determine accurately, but the difficulty of closing out properly is well known.

Make your people want to stay on your job by good partnering practices and developing a feeling for what people need to succeed in their work. Your turnover will diminish and you'll find that people will fight to stay on your project to the successful end.

Recommendation Number Twenty Four - Be certain to determine all the actions needed to start work on any given action during the job. Delays to, or untimely starts of any project action, particularly very early or very late in the job, can be disastrous.

Frequently in job meetings and partnering workshops the remark is made that timely action is critical. Typical fragmentary comments are--"shortage of installation time due to previous work delays", "not having the work ready to punch out", "lack of well defined up-front schedules", and the list goes on and on.

Design and construction consists of two major kinds of actions, supportive and ex'e'cutive.² Support actions supply the job with resources, including information and approvals. Executing actions use the resources to put the job together in the field. In most of today's project delivery systems the project manager is responsible for support actions, the field superintendent is responsible for ex'e'cutive actions. Whichever you are, be certain that your work meshes with the work of the other. Intelligent action taken in a timely manner is the hallmark of a good manager.

² See glossary of terms in Appendix A for a full definition of supportive and ex'e'cutive.

Recommendation Number Twenty Five - Be honest and open with other stakeholders about your plans and schedules.

It is a constant source of surprise how some project managers and supervisors in planning, design, construction, and owner offices use their plans and schedules as weapons of force rather than as tools of persuasion. A schedule of work, just like statistics, can be molded to convey any impression the manager wishes. An example--"we prepare two schedules, one we give the subcontractors, and the other we run the job with." This dual use of planning and scheduling certainly contradicts good partnering practice and it can easily backfire.

For instance a mechanical contractor might add unneeded time into the delivery schedule of an air handling unit, and receive it on time by his schedule, but a month earlier than his published schedule date. The general contractor meanwhile could easily have constructed the mechanical floor slab and equipment bases to match the actual delivery, but didn't since he was following the inflated time schedule. This foolish gamble incurred additional risk and charges for ground storage and protection of the unit, and unnecessary costs for double handling the early-arrival unit. Don't play games with schedules and don't use them as weapons.

"Construction Russian roulette is a high-risk game, usually not worth winning or losing."

Recommendation Number Twenty Six - Determine early in the project the profit motive held most important by each of the parties and then try to work to help them achieve that specific profit through your efforts.

The seven types of profit are financial, social, self-actualization, value system, technical, enjoyment, and educational.³ Each is dear to the hearts of those who are trying to achieve them. If you are able to achieve your own profit while helping others on the project team to be profitable, all of you will soon be working together in an effort to accomplish the other noncontract objectives defined in the charter.

Those who have worked with charters on successful jobs say that the cohesiveness of purpose that is produced among people on the project is one of the major benefits of the partnering concept. Partnering works.

³ See Appendix A - Glossary of Terms, for definitions of profit types.

- A. All 2,855 problems mentioned by stakeholders attending the charter meetings were coded in accordance with a special classification system. Problem statements resulting from the charter meeting fell broadly into forty-five major classes. These classifications are listed alphabetically in Table D4 below along with the three letter identification code used to identify the problem in the data base.
- B. Problem statements and their accompanying characteristics were next entered in a data base file containing the following information fields:
 - Problem statement.
 - Problem codes applicable - not limited in number.
 - Problem master code - the best and most descriptive code of those applicable.
 - Project on which the potential problem was identified.
 - Workshop in which the problem was identified.
- C. Problem statements were edited to clarify intent.
- D. Problem statements were arranged both alphabetically and in descending order of total mentions.
- E. Where problem duplicates were encountered the problem statement was kept in the file, but coded to indicate that there were other similar problem statements in the file. One multiple-mentioned problem statement was kept in the active file. However, all mentions were counted in the tabulations..

Where there was a doubt about the meaning or value of the apparent duplicate,

it was kept in the records.

Section B - Project Type and Location

Types and locations of the projects included and their locations are summarized in Tables D1, D2, and D3.

Table D1

Types and number of partnered projects:

New hospital -1
Insurance office addition and expansion - 3
Neighborhood out-patient health clinic - 1
Storm water retention basins - 3
National data processing center - 1
Magnesium extrusion plant - 1
Community college activity center - 1
International airport addition and expansion - 2 (internal staff and construction)
Resort hotel - 1
Major freight terminal - 1
Paving contractor maintenance and office facility -1
Major urban federal courthouse - 1
Elementary and middle school addition and remodeling - 1
Revisited charters - 2 (hospital and one insurance office)
Seminar case studies on office buildings - 3

Table D2

State locations of partnered projects:

Connecticut,
Iowa,
Massachusetts,
Michigan,
Nebraska,

Table D3

City location of partnered projects:

Detroit, Michigan,
Lansing, Michigan,
Plymouth, Minnesota,
Saginaw, Michigan,
Eaton Rapids, Michigan,
Muskegon, Michigan,
Omaha, Nebraska,
Frankenmuth, Michigan,
Minneapolis, Minnesota,
Middletown, Connecticut,
Cedar Rapids, Iowa,
Boston, Massachusetts,
Carson City, Michigan,
Dearborn, Michigan.

Section C - Major Classes of Problems

The problems listed in Table D4 below have their genesis in practices and procedures within the construction process. Almost as soon as problems are raised in a partnering charter meeting the distinction of whether they are "problems others cause us" or "problems we cause others" evaporates. A problem is a problem is a problem....

In the discussions below the abbreviation "tm" stands for total mentions...the total number of problems where this factor appears as an identifiable component in the 2,855 specific problem statements. The "sm" abbreviation stands for single mentions. The are what I considered to be the most applicable descriptor of a problem statement. For instance, one participant mentioned as a problem that "owners side with engineers in almost any dispute." That problem included elements of cwo (communicating with others), ppp (personnel quality problems), jma (job management), and sma (staff morale and attitudes).

Each of these problem types earned one of its total mentions in that example. As I studied this particular problem, the factor "staff morale and attitude (sma)" emerged as the overriding cause of the problem and was assigned as the single-mention (sm) master code. Each of the problem statements is made up of one or more of the forty-five factors in the total mentions and has been refined to a single-mention cause.

In Table D4 is a list of the forty-five factors by which the design and construction problems referred to above were identified. Most times a problem is associated with more than one factor which has caused the event to become a problem. Letters used in the abbreviation type follow no set formula. They are a mnemonic device to help remember their meanings.

Problem types are shown in alphabetical order in Table D4. The problem type is listed first, followed by the problem type code, and then by the number of times that code type was assigned by me to each of the problem statements made in the charter workshops. Since any given problem could receive more than one code classification the totals for all statements add up to considerably more than 2,855.

Table D4

Problem types listed alphabetically

- Approval processes - apv - 90
- Backcharges - bch - 11
- Being a good off-site neighbor - ofn - 88
- Being a good on-site neighbor - onn - 475
- Closing out the project - clo - 112
- Communicating with others - cwo - 984
- Constructibility - cbl - 20
- Construction document quality - cdq - 267
- Contract interpretation - coi - 97
- Cost growth - cgr - 64
- Decision making - dma - 133
- Documents and documentation - doc - 141
- Equipment and materials - emp - 145
- Financial matters - fin - 11
- Inspecting and testing - ite - 69
- Issue, conflict, and problem resolution - ire - 166
- Job management - jma- 1146

- Labor conditions - lab - 14
- Legal matters - leg - 14
- Maintaining project evaluations - mpe - 52
- Organization, authority, and responsibility - oar - 371
- Paper and administrative work - paw - 92
- Payment processing - ppr - 95
- Personnel quality and problems - pqp - 593
- Planning and scheduling - pas - 396
- Policies and procedures - pop - 70
- Project cost structure - pco - 116
- Procurement of materials and equipment - prc - 125
- Program conditions - prg - 233
- Quality management - qma - 97
- Regulatory agency matters - reg - 49
- Revision processing - rev - 268
- Safety - saf - 52
- Staff morale and attitudes - sma - 684
- Staffing and manpower - stf - 69
- Substitutions and alternates - sal - 58
- Submittal processing - spr - 205
- Time growth - tgr - 73
- Timely action - tac - 467
- Training - tng - 22
- User group interaction - ugi - 166
- Value engineering - ven - 22
- Warranty conditions - war - 5
- Weather conditions - wea - 10
- Work site conditions - wsc - 288

In Table D5 the problem code material has been arranged in descending order of the number of times the problem was assigned that type. The rankings are shown in the left column, followed by the number of total problem code assignments, and then by the problem category.

Table D5

Total assignments of problem types listed by frequency of appearance

01. 1146 - Job management.
02. 0984 - Communicating with others.
03. 0684 - Staff morale and attitudes.
04. 0593 - Personnel quality and problems.
05. 0475 - Being a good on-site neighbor.
06. 0467 -Timely action.
07. 0396 - Planning and scheduling.
08. 0371 - Organization, authority, and responsibility.
09. 0288 - Work site conditions.
10. 0268 - Revision processing.
11. 0267 - Construction document quality.
12. 0233 - Program conditions.
13. 0205 - Submittal processing.
14. 0166 - Issue, conflict, and problem resolution.
15. 0166 - User group interaction.
16. 0145 - Equipment and material problems.
17. 0141 - Documents and documentation.
18. 0133 - Decision making.
19. 0125 - Procurement of materials and equipment.
20. 0116 - Project cost structure.
21. 0112 - Closing out the project.

22. 0097 - Contract interpretation.
23. 0097 - Quality management.
24. 0095 - Payment processing.
25. 0092 - Paper and administrative work.
26. 0090 - Approval processes.
27. 0088 - Being a good off-site neighbor.
28. 0073 - Time growth.
29. 0070 - Policies and procedures.
30. 0069 - Inspecting and testing.
31. 0069 - Staffing and manpower.
32. 0064 - Cost growth.
33. 0058 - Substitutions and alternates.
34. 0052 - Maintaining regular project evaluations.
35. 0052 - Safety.
36. 0049 - Regulatory agency matters.
37. 0022 - Constructibility.
38. 0022 - Training.
39. 0022 - Value engineering.
40. 0014 - Labor conditions.
41. 0014 - Legal matters.
42. 0011 - Backcharges.
43. 0011 - Financial problems.
44. 0010 - Weather conditions.
45. 0005 - Warranty conditions

In Table D6 the problem code material has been arranged alphabetically by problem type. The total problem statement assignments are shown in the left numeric column, followed by the percent of these to the total of all statements, and then by

the number of master code assignments for that problem type.²

Table D6
Total assignments of problem types

Code definitions, number of total mentions (tm), % of total mentions to 2855 responses (%), and number of single mentions (sm). Percentages have been rounded up and down. Those below 01% are given as 01%.

Approval processes - apv	tm = 0090, % = 32, sm = 042
Backcharges - bch	tm = 0011, % = 01, sm = 011
Being a good off-site neighbor - ofn	tm = 0088, % = 03, sm = 007
Being a good on-site neighbor - onn	tm = 0475, % = 17, sm = 087
Closing out the project - clo	tm = 0112, % = 04, sm = 081
Communicating with others - cwo	tm = 0984, % = 35, sm = 234
Construction document quality - cdq	tm = 0267, % = 09, sm = 196
Constructibility - cbl	tm = 0020, % = 01, sm = 013
Cost growth - cgr	tm = 0064, % = 02, sm = 014
Contract interpretation - coi	tm = 0097, % = 04, sm = 024
Decision making - dma	tm = 0133, % = 05, sm = 073
Documents and documentation - doc	tm = 0141, % = 05, sm = 028
Equipment and materials - emp	tm = 0145, % = 05, sm = 023
Financial matters - fin	tm = 0011, % = 01, sm = 002
Inspecting and testing - ite	tm = 0069, % = 02, sm = 041
Issue, conflict, and problem resolution - ire	tm = 0166, % = 06, sm = 029
Job management - jma	tm = 1146, % = 40, sm = 319
Labor conditions - lab	tm = 0014, % = 01, sm = 003
Legal matters - leg	tm = 0014, % = 01, sm = 004

² See Section A of Appendix D for explanation of the single mention code.

Maintaining project evaluations - mpe	tm = 0052, % = 02, sm = 011
Organization, authority, and responsibility - oar	tm = 0371, % = 13, sm = 106
Paper and administrative work - paw	tm = 0092, % = 03, sm = 026
Payment processing - ppr	tm = 0095, % = 03, sm = 083
Personnel quality and problems - pqp	tm = 0593, % = 21, sm = 034
Planning and scheduling - pas	tm = 0396, % = 14, sm = 098
Policies and procedures - pop	tm = 0070, % = 02, sm = 005
Project cost structure - pco	tm = 0116, % = 04, sm = 033
Procurement of materials and equipment - proc	tm = 0125, % = 04, sm = 060
Program conditions - prg	tm = 0233, % = 08, sm = 100
Quality management - qma	tm = 0097, % = 04, sm = 053
Regulatory agency matters - reg	tm = 0049, % = 02, sm = 023
Revision processing - rev	tm = 0268, % = 09, sm = 118
Safety - saf	tm = 0052, % = 02, sm = 042
Staff morale and attitudes - sma	tm = 0684, % = 24, sm = 299
Staffing and manpower - stf	tm = 0069, % = 02, sm = 047
Submittal processing - spr	tm = 0205, % = 07, sm = 123
Substitutions and alternates - sal	tm = 0058, % = 02, sm = 040
Time growth - tgr	tm = 0073, % = 03, sm = 008
Timely action - tac	tm = 0467, % = 16, sm = 097
Training - tng	tm = 0022, % = 01, sm = 012
User group interaction - ugi	tm = 0166, % = 06, sm = 026
Value engineering - ven	tm = 0022, % = 01, sm = 019
Warranty conditions - war	tm = 0005, % = 01, sm = 004
Weather conditions - wea	tm = 0010, % = 01, sm = 008
Work site conditions - wsc	tm = 0288, % = 10, sm = 133

Section D- Problem Code Definitions

The meaning of each problem category is described below. Problem categories all have a positive and a negative side. If certain elements of the problem type go well, it is possible there is no problem. On the other hand if the elements of a problem type go poorly, the situation caused by the elements going poorly will usually cause difficulties.

Problem types are listed in alphabetical order. The problem type code follows the name. The total mention (tm) and single mention (sm) information is as described in Section C above.

Approval processes - apv

tm = 90, sm = 42

The official acceptance of information or submittals needed on the project from regulatory agencies, governmental bodies, the user, the owner, the design team or any of the members of the construction group is critical to job success. A delay in approval can seriously affect job planning and scheduling.

Backcharges - bch

tm = 11, sm = 11

These are charges for actions such as clean up, hoisting, equipment use, damage to installed work, or other such items for which the party furnishing the item feels they are entitled to be paid. A backcharge is often deducted from a payment being made by the party providing the item to the party receiving the item. Problem arise when backcharges are deducted without prior negotiation or notification, especially when there appears to be insufficient cause for the charge.

Being a good off-site neighbor - ofn

tm = 88, sm = 7

This is project participant behavior that relates well to the people, organizations,

or facilities outside the construction site boundaries. When on-site actions cause off-site aggravation...noise or dust from a project; or when off-site actions interfere with off-site neighbors...dirt and other debris left on roadways...it's difficult to be effective builders. Nearly everyone must get to the site by going through the neighborhood--be friendly to the people who live there.

Being a good on-site neighbor - onn

tm = 475, sm = 87

On-site behavior of project staff, determines how well they are treated by other on-site people. Poor job behavior almost always damages the informal organizational and social relations so critical to healthy jobs. The best rule is still to treat others the way you want to be treated. It's the quickest way to learn the benefits of being a good on-site partner.

Constructibility - cbl

tm = 20, sm = 13.

The degree to which the design of the facility is found to be buildable. Often when there's a constructibility problem the project or a component of the project cannot be built as called for by the contract documents. This may lead to serious delays, costs, redesign, and hard feelings on the job.

Construction document quality - cdq

tm = 267, sm = 196

Problems caused by poor quality control in the preparation of working drawings and specifications. Difficulties are usually caused by unclear or contradictory notes, drafting errors, poor workmanship, incomplete information, dimensional errors, or other similar detractions.

Closing out the project - clo

tm = 112, sm = 81

Closing out means properly finishing the project totally or in part. Factors related to close-out problems affects owners through delayed occupancy, and contractors and subcontractors by delays to completing their work. Improper close-out also adversely affects payment of retainage and often increases costs difficult to associate with any specific party to the job.

Communicating with others - cwo

tm = 984, sm = 234

Information exchanges between or among individuals, groups, or organizations, can be oral or visual, and may express a new thought or a commonly understood policy. Problems caused by the inadequate exchange of thoughts, messages, or information in construction makes communication with others an important factor in design and construction.

Contract interpretation - coi

tm = 97, sm = 24

Any contract is open to interpretation. Serious problems may arise from substantial differences in those interpretations especially in the understanding of various parties as to what their work scope is and what they are entitled to claim when they are hurt by a unilateral contract interpretation. Contracts being legally binding, this factor can quickly escalate from a simple problem into a disaster if not resolved promptly.

Cost growth - cgr

tm = 64, sm = 14

Changes in project cost, either greater or less than expected often affect the program or project. Growth may be positive for some participants and negative for others. Problems considered here often produce damaging impacts through

unfair risk assignment.

Decision making - dma

tm = 133, sm = 73

Wise decisions at the proper time are much to be sought after. Inadequate, improper, or untimely decision making on project-related matters by those not competent nor authorized is frequently a cause for much trouble.

Documents and documentation - doc

tm = 141, sm = 28

Every construction job requires documentation from conception to occupation. Improper, inadequate, unneeded, or excessive paper work that blocks effective management and implementation is likely to result in long standing and difficult problems.

Equipment and materials - emp

tm = 145, sm = 23

You can't build a job without them. Problems with procurement, storage, installation, or functioning of equipment and materials used on the project can create a nightmare.

Financial matters - fin

tm = 11, sm = 2

Financing is at the heart of any building project. Problems related to the methods, amount, availability, or reliability of project funding are difficult to discern early and are even more difficult to resolve before they do their damage..

Issue, conflict, and problem resolution - ire

tm = 166, sm = 29

Problems are meant to be solved. The best course of action is to agree in advance how the parties will resolve emerging issues fairly and speedily. Prompt settlement of conflicts, contested claims, and other disruptive or destructive action between or among the project participants is essential to conserving profit. Unresolved issues cost dearly and create hard feelings.

Inspecting and testing - ite

tm = 69, sm = 41

Safety and quality are the hallmarks of good construction. Inspection and testing are designed to guarantee safety and quality. That means that someone qualified must inspect and test. Problems generated by poor, or untimely inspections and poor testing methods, personnel, management, or interpretation can have a serious impact on the project.

Job management - jma

tm = 1146, sm = 319

Good leadership and knowledge-in-depth of the total project or of its components constitute 80 percent of job management. The proper use of skills in planning and scheduling, assigning resources, and assembling and effectively utilizing resources enhance the prospect of job success. Conversely, bad management can doom a design and construction project before it begins.

Labor conditions - lab

tm = 14, sm = 3

Conditions, rules, laws, and obligations exist under which project participants work on any project. The term labor usually refers to tradesmen and women of all skills located at the job site. Problems arise when there are poorly managed union-nonunion disputes, ineffectual communications between management and tradesworkers, financing problems or any of the multitude of conditions

that adversely affect the lifeline of the project--financial health for all.

Legal matters - leg

tm = 14, sm = 4

The construction practitioner operates under the rule of law, but cannot afford to become preoccupied by it. Adverse legal actions expected or taken on a project can reduce or destroy potential for good project performance.

Maintaining project evaluations - mpe

tm = 52, sm = 11

Competent monitoring, analyzing, and acting on information derived from a plan of work is an integral part of managing. In partnering, evaluation is often implemented by regularly measuring actual partnering performance against standards set by the stakeholders in the charter. Problems arise when the process is ignored by the stakeholders or when subjective evaluations replace objective measures.

Organization, authority, and responsibility - oar

tm = 371, sm = 106

Organization, authority, and responsibility patterns spring from a functional need for responsible need for competence and leadership. The pattern may be assigned or assumed, and will generally govern project and program actions on the job. Problems follow when the organization, authority and responsibility needs are disregarded or unfilled. The results will often be a disrupted project, uninformed participants, and frayed tempers.

Paper and administrative work - paw

tm = 92, sm = 26

Documents, letters, and other communications, whatever the media, must flow

quickly and accurately among, between, from, and to project participants. Paperwork frequently creates a love-hate relationship. Imposing too much communication without a corresponding value-added is a distraction and annoyance. Too little communication may produce a value-subtracted situation by encouraging management-by-blindfold where stakeholders run their work by guessing and assuming. There is a right amount of paperwork for each job.

Payment processing - ppr

tm = 95, sm = 83

The methods, practices, and timing of payments due to or from project team members are usually spelled out in contract documents. Problems arise when one party disregards that agreement or when practices in billing and paying become sloppy. Prompt payment is a great stimulator of good work.

Personnel quality and problems - pqp

tm = 593, sm = 34

The labor pool, wages, and the press of business will determine who works on what job. Variations in personnel abilities, qualifications, desires, skills, attitudes, and honesty of the project staff working in the interests of the project can give rise to any number of conflicts and problems.

Planning and scheduling - pas

tm = 396, sm = 98

Competent design, and construction sequencing, resource assignment, scheduling, and procurement planning for project actions are some of the easiest roads to a successful job. Failure to plan and schedule will lead to failing to do the job well. The job of the manager is to plan the work, and then, work the plan.

Policies and procedures - pop

tm = 70, sm = 5

These are detailed statements of expected behavior, sequences, courses of action, and principles that help determine decisions, actions, and other matters for the participants on a planning, design, and construction program. Usually, policies and procedures are set both for the firms involved in doing the project work and for the project. Problems arise when those policies and procedures are unrealistic or when involved firms cannot or will not conform to agreed-on policies and procedures.

Procurement of materials and equipment - prc

tm = 125, sm = 60

Procurement is the process of detailing, approving, fabricating, and delivering materials, equipment, and other physical elements to be installed in the facility. Intelligent, experienced management and strong interest in excellent performance is at the core of successful procurement. Procurement problems cause frustration and delays.

Program conditions - prg

tm = 233, sm = 100

The quality of the project program has a sizable effect on the design, construction, turnover, and use of the facility. Good programs help design and build a good facility. Poor programs hinder the work, and often lead to damaging project surprises.

Project cost structure - pco

tm = 116, sm = 33

The characteristics of the project relative to how funding is determined, allocated, and disbursed to the project participants determine the project cost

structure. Cost structure is usually established during early programming of the project. It can begin there as a problem or it may rear its ugly head later if there is an unwelcome change.

Quality management - qma

tm = 97, sm = 53

This concerns factors in project success or failure that are related to the quality of people, workmanship, materials, equipment, or organizations being used on the project. Quality, as used here, means of a nature that meets contract requirements and produces results that satisfy or exceed expectations. Anything less may be a problem.

Regulatory agency matters - reg

tm = 49, sm = 23

Rules and guidelines are often are set by regulatory agencies in the public or private sectors. Regulations can be maintained by voluntary compliance or by compliance dictated by law. Intelligent compliance with legitimate, well interpreted regulations helps a job.

If the rules and guidelines are misused or poorly interpreted problems will surface. Regulatory difficulties often occur because regulators are sometimes not considered as a participant in the project. The result of this is an us-them mentality that produces potentially damaging conflicts between the regulators and the stakeholders.

Revision processing - rev

tm = 268, sm = 118

This factor includes steps taken to properly and effectively produce project revisions from formulation to implementation of the change. As a supportive

action, good revision processing is almost invisible. Continued poor performance in this critical part of a design and construction project leads to progressive deterioration of nearly all job management functions.

Safety - saf

tm = 52, sm = 42

Provision and maintenance of safe working conditions on the job site is crucial to job success. Safety problems usually result in damage or injury. Both harm job quality and progress.

Staff morale and attitudes - sma

tm = 684, sm = 299

Individual and collective morale and attitudes of people can heavily influence and shape working conditions and outcomes on a project. Often morale and attitude problems are matters of perception which may or may not correspond with reality. Good morale and constructive enthusiasm on design and construction projects are always welcome contributions to project health.

Staffing and manpower - stf

tm = 69, sm = 47

Defines the number of staff resources on the project and their quality, competence, and abilities. When resources are available the job moves well-- when resources are lacking, frustration and confusion result.

Submittal processing - spr

tm = 205, sm = 123

Submittal processing concerns preparing, delivering, reviewing, approving, and returning shop drawings, specifications, designs, samples, cuts, and other

documents or objects that must be approved as required by the contract provisions. Done well, submittal processing makes a job support system function well. Lack of competent attention to the procedure causes problems and delays.

Substitutions and alternates - sal

tm = 58, sm = 40

Relates to suggested or actual substitutions or alternative materials, equipment, methods, or systems that are considered for use in place of those already specified or shown on the contract documents. Problems arise when substitutions and alternatives degrade quality, present a false cost saving, or unfairly shift profit or loss among project participants.

Time growth - tgr

tm = 73, sm = 8

A change in time either greater or less than expected that produces an impact upon the project or program. This impact, particularly when time is extended, almost always indicates a problem will or has appeared.

Timely action - tac

tm = 467, sm = 97

Timely action can mean action taken at the correct or effective time, or action taken for a correct or effective duration. Problems can be related to taking, or failing to take, timely action on any project or program related matter.

Training - tng

tm = 22, sm = 12

Adequate training and education of the project team is a management necessity. Problems arise when training and education are inadequate.

User group interaction - ugi

tm = 166, sm = 26

To produce a successful project, project team members and stakeholders must maintain effective informational, technical, business, and professional relationships with the owner and the end user of the facility. When these relations are damaged or ignored problems are almost certain to follow.

Value engineering - ven

tm = 22, sm = 19

Cost and other cost related benefits are often gained on a generic construction project by improving the means, methods, materials, and sequences of architectural and engineering systems used. Without striving to improve value within the target cost restraint a job remains a static system. Value engineering is best applied before construction contracts are awarded.

Warranty conditions - war

tm = 5, sm = 4

Warranty conditions are those construction guarantees placed in effect subsequent to completion of the work and usually upon acceptance by the owner. Warranty problems arise when their starting or expiration dates are unfairly assigned or unilaterally imposed for the benefit of one party, and the detriment of the other.

Weather conditions - wea

tm = 10, sm = 8

Weather and construction are either fighting or are friends., but weather will have its way. Bad weather at a poorly managed job can create insurmountable obstacles to good work. Weather is one of the best documented scientific occurrences that exist. The manager is not expected to change the weather. He or

she is, however, expected to know the when, how, what, and where of weather in their locality so the people on the job can maintain work continuity and profitability irrespective of poor weather conditions.

Work-site conditions - wsc

tm = 288, sm = 133

The work site condition almost always affects the project. A poorly-organized and badly-maintained work site prevents people from doing their best work, even when they want to do well. A clean, safe, well-planned work site shows respect for those who earn their salaries by working there. It helps them do a good job. Poor site working conditions demotivate--good site working conditions motivate. One leads to trouble and danger--the other shows good faith and confidence.

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About Ralph J. Stephenson, P.E.

Ralph J. Stephenson, P.E., is an engineering consultant who has a diversified background in land planning, facilities location, building design, and construction.

Mr. Stephenson earned degrees at Lawrence Institute of Technology (Bachelor of Science, Mechanical Engineering), and Michigan State University (Master of Science, Civil Engineering). He has been associated with such firms as Smith, Hinchman, and Grylls, Victor Gruen Associates, Benjamin Schulz Associates, and the H. F. Campbell Company. With the latter three organizations Mr. Stephenson occupied executive positions as vice president. In 1962 he started his own consulting practice, specializing primarily in providing operational and management direction to owners, designers, and contracting firms.

He is a registered professional engineer in Michigan, Wisconsin, Illinois, Indiana, Ohio, Pennsylvania, West Virginia, Virginia, Florida, and Minnesota. He is a member of the Engineering Society of Detroit, the Michigan and National Society of Professional Engineers, the American Planning Association, the Detroit Area Economic Forum, and the Mid-America Economic Development Council.

Since 1952 Mr. Stephenson has been involved at middle and upper management levels in the planning, programming, design, construction, and operation of several billion dollars worth of construction related projects. These include work on industrial, commercial, and institutional programs throughout North America.

Mr. Stephenson has also chaired numerous partnering charter meetings for both public and private sector projects, and has lectured extensively on the subjects of alternative dispute resolution and partnering.

He has also taught hundreds of technical and management seminars in the United States, Canada, and Europe and is the author of several magazine articles and is the co-author of a book on critical path method. His broad experience has given him an understanding of the nature of small, medium, and large size companies, and of the need to solve their management problems through creative, systematic, and workable approaches.

