Lean Six Sigma Quality Transformation Toolkit (LSSQTT)*
LSSQTT Tool #22 Courseware Content
“Culture For Service And Change:
Communications And Management As Disciplined Opportunities”

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*Updated fall, 2007 by John W. Sinn.

The Service Function And Change

If an organization or parts of an organization do not directly make changes in physical raw materials, then that organization probably qualifies as a service organization. This is important for several reasons. First, this is a growing sector in our economy--many new jobs being created fall into the service realm. Second many positions in technological organizations which industrial technologists may be employed in, are of a service orientation. Third, and perhaps most important, service functions and their management provide several insights which can prove useful, improving virtually any organization.

It appears important to distinguish between service internal and external to the organization. This provides a major thrust of the current section. A second major emphasis is the overall role which service plays in technological organizations. Third, and already apparent throughout the tool, is the unique relationship enjoyed between service, maintenance, safety and other functions.

Because of the nature of technological organizations, and their particular functions, as spelled out earlier, service within the organization is presented ahead of service external to the organization. But, as will be shown throughout the section and tool, a strong relationship must exist between internal and external constituencies. That is, for most organizations to remain competitive, it is vital that service external to their customer be of paramount importance. But, this tool is also heavily focused toward making organizations, particularly technological organizations work better internally to be more competitive.

For example, if engineering does not complete the specifications for a given component or part on schedule to coincide with production, then production may fall behind, or be forced to cut corners to meet marketing and sales commitments. Or if maintenance says they will install a new machine on a given production line, but someone in store services slipped up and forgot to process the order for the new equipment, then how can the new equipment be installed, again to meet production commitments. The list of examples could go on and on, because in reality, virtually every component within the organization services one or more others. All are contingent to one extent or another, and all rely on one another for various services.

Similarly suppliers and customers are related to the organization in service functions, requiring a clear understanding. The relationship is illustrated nearby. The key point here is that an organization needs to pay attention to how it arranges itself, acknowledging that it is very important to realize that the service function, both internal and external, is vital to survival. It is also true that an organization that wants to succeed in the service arena must be structured to encourage and facilitate innovative thinking. Service relies, to a great extent, on the ability of an organization to recognize problems with the current way of dealing with internal and external customers, and use this as an opportunity to create a positive change. This requires innovative organizational structure and persons empowered to bring novel ideas forward, and see them through to implementation.
It is believed that the technological functions organizational structure provided here in the form of the technological change model, can assist in facilitating the necessary environment for innovation. This could be particularly true when combined with team empowerment for participatory management and decision making. This is sometimes referred to as the inverted pyramid structure, placing front line employees in the key decision making roles, and in terms of quality circles for problem identification and solving. This would contrast to the traditional top down management style of upper management "calling all the shots". Regardless of what it is called, it is pivotal that people have reasonable autonomy to do their work, and be able to function with sufficient authority to make and act on decisions. This forms part of the basis for teams, empowerment, and organizations of the future.

**Technological Infrastructure, Culture**

The technological change model is presented again here because it is important to realize that it is designed to facilitate service functions as discussed.

**Service as an upstream management function--value added.** Part of the key to competitiveness, built around the information previously presented, and addressed from the vantage point of documentation and Kaizen, is service within an upstream management function. Fundamentally, if we build the product properly at each operation, process or function, we will pass along a value-added product. Kaizen is about eliminating muda or waste, in gembra or the workplace. Waste is defined as the non-value added functions or activities which were identified in previous tools. The key distinction is value added as differentiated from non-value added. These are now listed again for making connections to serving customers and suppliers.

Waste can take on any shape but typically it can be classified into one of the following groups: overproduction, delay, transport, processing, inventory, wasted motions, and defective products. Identification then becomes the primary step in elimination of waste. If we don’t see something as a waste, how can we eliminate it? As production persons we must stop using the excuse that certain waste cannot be helped. It is called a positive attitude. When we see a part of the operation which does not add value we must take the attitude that it can and must be eliminated. Until we take this attitude we will miss opportunities to eliminate waste, or improve--in this case as a service.

One of the keys in identifying and reducing waste for service functions is what we term upstream management. Based on the assumption that an upstream function must, by definition, service the next operation or process, downstream, we begin to recognize the importance of the upstream concept. If each operation reduces value rather than adding value, we can create a larger problem with each added operation. Assuming each operation is functioning properly, and understands clearly its role in the total sequence, we can likely anticipate properly added value from supplier to customer. We may have misunderstandings or lack of clarity in function between supplier and customer, or in various operations, start to finish.

The sequence of production, even when properly designed and put together, does not always function properly. As we move forward with our illustration of management upstream, we must recognize that although correction is in fact waste, it may be less wasteful relative to creating scrap. Worse yet, if we do not discover the defect or defective, we may pass it along to the next operation in a condition which is not only undesirable, but is downright unacceptable. Assuming the part is detected and corrected, it can then be passed on to operation 3, and ultimately to the downstream customer. The key concepts underlying the principles are the elimination of the wastes, or imperfections, which are currently present in delays, or non-value adding operations. This will rely on Kaizen inspection techniques, poke yoka methods, and other synchronous methods, all designed to facilitate JIT in the service environment.

JIT is a process which must be supplied with the required items in the required quantity at the required time. This can result in stockless production systems, with no inventory, anywhere, period. This is one of the keys to synchronous techniques, and to becoming world class. If the JIT system is to work, everyone in the equation must be part and parcel of the system. Suppliers must
deliver and customers must expect delivery in JIT fashion. If not, then the system is incomplete. This refers to internal and external suppliers and customers, up and downstream throughout the organization or process.

Capacity, SOP and other synchronous relationships to kaizen in service. Kaizen is about waste reduction. If we wish to reduce or eliminate waste, as we must do if we wish to be successful in Kaizen, we must identify the capacity of the operation for adding value, and use the operation to its optimum performance capacity.

When physical changes are made in value added technological functions, rather discreet and identifiable specifications can be defined as the target for performance, and the standard to be gaged against. But in service related functions it is much more ambiguous, and perhaps more difficult to determine the mark, let alone if we are hitting the mark. Yet, never before has the need been greater to set workable and useful standards for human achievement in service functions.

The basic problem in setting and measuring service standards is twofold. First, and perhaps most important, service activities are often not physical, or at least not readily measurable in the sense of a manufactured component. Second, service is fundamentally a people function, and thus the standards and gaging systems are fundamentally people evaluations. The issue of service activities not being readily measurable will be addressed as a relative type condition. That is, even in the most discreet manufacturing situation with carefully and clearly detailed specifications, and with the most advanced gaging devices, the end result will still be only as good as the person using the gages and doing the actual manufacturing work. This is relative since in service work, it is simply a matter of figuring out what, and how to, measure for quality determination.

Generally, in service functions a relative degree of finiteness can be achieved. If the task is servicing machines we can determine that all surfaces are to be wiped and coated, all oil reservoirs topped up, belts checked for tension, floors swept in the general area, and other general observations and tasks performed. Based on past experience, time studies, and other inputs, we could determine some reasonable standard of time to be consumed to conduct the work. Follow-through to determine how well everything had been accomplished could occur via supervisors or workers on the floor, or both. Most "judgment call" type issues or elements can be placed on check sheets or attribute tracking forms for quality purposes, or simply to track for improvement. At a more robust level, we can calculate control limits based on p charting statistical techniques, for further analysis and follow through.

As with other service functions, performance standards must be based on what is expected by the customer. At some point the organization must determine what is important to consumers of their product, articulate that into standards for all personnel in the organization, and measure for compliance to the standards as initiated by the customer. This must go well beyond simply comparing our performance with similar organizations, although this is part of the way we all set standards. Equally as important, we must not let the standard become the minimum performance. Rather, we must strive to use standards as targets which are set to enhance performance and which help people strive for excellence. Thus, we are determining standards for performance, to one extent or another, based on customer input.

Common sense suggests whatever performance standards are set, that these standards should be consistent with broader objectives of the organization. It is also important that performance standards be communicated widely throughout the organization to enable all persons to understand and use the same set of criteria for performance. It would also seem reasonable to expect that standards be a part of job descriptions, and that the standards be used in a proactive manner for overall job performance evaluation, commonly called work evaluation (annual, semi-annual, and so on).

Understanding customers and suppliers--kaizen process in action. Part of the success in servicing our customer and supplier relationships has to do with understanding their needs. This is key to the Kaizen process--understanding what is expected of us, better enabling us to know how to accomplish what is expected of us. One of the key methods for helping us understand customers and suppliers is through survey interview techniques. The purpose of the interview is to collect information about:

1. How well the current product or service being supplied meets the needs of the customer, and to learn more about what they deem to be important--and needing to be focused on. Obviously for suppliers it is necessary to determine how their process impacts on customer operations.
2. How the customer or supplier measures, teaches about, and uses the product or service--this is what will give added input and enable improvements for the future.

3. How well the product/service supplied or consumed is defined and understood.

These types of surveys are generally used when it is important to determine reasons and motivation for dissatisfaction which has resulted somewhere in the relationship. We may also wish to use interviews to determine where improvement opportunities may exist, even in the absence of complaints or problems. It should also be apparent that if we wish to acquire additional business with current customers or suppliers, we should "stay in touch" through these types of interviews and surveys.

Finally, determining the best supplier will also increasingly be a function of the survey process.

The basic process would generally be documented in a survey type format, frequently completed by an interviewer, based on questions related to the following:

1. **Define product or service.** It is of prime importance to define the product or service. Similar to understanding our process, it is pivotal to understanding clearly what our purpose as a product or service is supposed to be, prior to trying to deliver.

2. **Form, reform team.** Based on understanding our function, form an interview/survey team, and help prepare them regarding why information is needed. What have the key problems or issues become, or what are the important issues for suppliers? Assuming this is a relatively mature process, the team may be a standing group which is brought back together from previous iterations. Obviously, all usual rules and guidelines for forming teams are applicable.

3. **Brief/update interviewee.** Prior to the interview the interviewee should be brief regarding the purpose of the interview. This would include determining who will be interviewed at the site, particular areas of concern, and information required or helpful and requested, and so on.

4. **Focus on key problems, opportunities.** During the interview it would be of prime importance that we focus the session on key deliverables or features which may be problematic. Opportunities for improvement are buried in problems emerging between the existing or potential customer/supplier mix.

5. **Use open-ended questions.** We will generally wish to use open-ended questions which will enable the person or people to supply a broad range of information. This should likely emerge as a "survey" or "audit" type document which is pivotal in the process being described here, and which is unique to the product and organizations involved. The forms shown nearby are the start of these open ended type questions. More specificity must typically be built in based on issues and circumstances in the situation.

6. **Review, clarify.** Always reflect back on what was said, or the way responses were supplied in writing, to ensure clarity.

7. **Provide written report.** Based on the overall process, culminating around the sample survey forms, summarize in report form. This provides the usual and necessary "paper trail", to help all have "better memory".

8. **Track performance trends.** As the process emerges over time, and becomes a regular iterative function toward building better customer and supplier relationships, we must observe the performance, tracking for data-based measures which will help in further future improvement efforts.

9. **Provide and implement improvements.** The data-based tracking system, and the broader inputs which the process "flushes out" must be ultimately brought forward as improvements. As we conduct the improvement process over time in the supplier/customer relationship, growing and learning together, the improvements should assist us all in becoming and remaining increasingly competitive.

Assuming this process is completed on a regular and systematic basis, it is likely that we will improve our relationship with customers and suppliers. In addition to the above, it will be important to track trends in the customer and supplier perception of how well the product or service is meeting the perceived needs. As this is being tracked, it will be important to establish the perception of customers and suppliers and use this to help build our relationship. This can be done each time product exchanges hands, or it can be done through periodic visits to the customer or supplier site. It should also be recognized, we should be providing and implementing improvements, ongoing, based on the
customer/supplier improvement process. As we conduct the process with customers and/or suppliers, we should be gaining input which can be turned into product improvements.

Part of the way we may wish to evaluate the customer/supplier perception, or the overall level of satisfaction, is based on several evaluative approaches alluded to earlier. These are provided in draft survey forms nearby, in three categories:

1. Potential supplier survey desirable attributes.
2. Supplier capability to potential customer.
3. Existing supplier response to enhance potentials.

While each is only the start of a system for improving relationships, they do have the basis for helping accomplish much of what is being talked about throughout the current tool. And in all cases, the documentation provided can help provide the basis for improved decisions. Each of these are designed to be used within the system being described broadly here, on a long term, ongoing basis, to assist in various types of improvement. The system should be applicable to internal and external suppliers and customers, to be modified to suit specific circumstances.

The general areas of questioning in the surveys provided are an attempt to nail down what we intend to build or deliver, how we will do it, the culture within which it will occur, and other broad areas of concern. Other areas which may be pursued in these types of survey systems would include:

1. Per cent of delivery on time.
2. Percent of rejected product.
3. Lead time requirements.
4. Order response time.
5. Specific data driven measures of capability (gage R & R, X-bar and R charts, Cpk).
6. Frequency and recency of visits required.
7. Joint work attitude and response.
8. Ability and willingness to share data and information.
9. Standard procedures for all relevant and/or related functions required.

Customer satisfaction is approached in the following steps or procedures. First the customer will need to identify their valued characteristics and features--in data driven ways. Based on the important features, we will need to work toward identifying the range of acceptability in product or service. We will also need to work with them to try to understand where and how in their process they measure to conform to their customer/supplier needs. The customer satisfaction approach under discussion can also be enhanced by asking and establishing several key questions relating to:

1. Frequency of visits desired on site--and for what purpose?
2. Nature and amount of information they will require?
3. Who should be contacted when there are problems or concerns which may arise?
4. How frequently this type of information and procedure is revisited to attempt to stay "on the same sheet of music".

Once again, this is only a start, and should not be regarded as an end-all approach. But with continued development and use, we will likely continue to improve our relationships, and move our competitive functions forward.

**Serving external customers.** Most of the above information was generally applicable to all service circumstances, both internal and external. But several considerations related to external customers warrant further discussion. This relates to image and impression, both real and perceived, which is created and marketed for the organization. This also relates to constantly paying attention to the actual service delivery system in the organization, since no matter how well we are marketed if we do not deliver, marketing will only blow in the breeze.

Particularly in technological organizations where value is physically added to raw materials, although applicable elsewhere, if the product fails to perform as it was advertised or specified, it will tend to be problematic. This also often provides an entree for service functions. For example, if only a few short months after purchasing a new vehicle, serious mechanical problems surface, several service functions will likely be called upon to help straighten out the problems. In this case, how do we handle the customer "after the sale"? Are they rebuffed on the phone? Do they get the run-around? How are they billed, or are they billed at all? Are we defensive about our product?

Once again, the basic question becomes, how do we satisfy the customer? But perhaps equally as important, do we wish to have a customer's repeat business? Also however, we must not forget that a satisfied customer will likely only tell one, or at best, two other people. But a dissatisfied customer may
easily tell eight or ten others, further enhancing the need for our organization to consistently follow-through on service delivery systems.

Still related to the product and service, when defects or malfunctions are discovered, are they merely corrected? Or do we have established systems to effectively communicate between service functions and engineering, quality and others to affect enhanced competitiveness in the future? This may also include communicating better to marketing about the performance claims they are making in sales to customers or improving information made available to training personnel to help prepare persons internally better. If product failure information is not used as opportunities for improvement, clearly we will miss possible situations to use to become more competitive.

Defining The Meeting And Culture, Calling, Conducting Good Meetings

Meeting, communication and many other associated team functions are tightly intertwined. Each communication and documentation opportunity, as well as each meeting, are times where teaching and learning occur. The way we understand and use this to everyone's best advantage deserves further discussion. The question of what a meeting should look like, is really nothing more than what we actually want our teams and the entire organization to look and function like. The conduct of meetings and teams is an excellent measure of the entire culture.

The tempo of meetings, the discipline and demeanor, how we follow the agenda, our ability to listen to one another without domineering, coming prepared rather than un-prepared, all are good indicators of our culture. If we are afraid to speak in meetings, provide healthy questions, encourage lively discussion, and so on, it probably says something about our real ability to trust one another and grow together as teams must if we wish to be world class. The intimate relationship which must be inter-twined with technical problem solving requires that we communicate and grow together for everyone's benefit. Meetings represent one of the best vehicles for this to occur--but we must work hard to facilitate effective meetings. Assuming meetings are working, we still must push effective communications during and beyond--verbally, written, electronic and so on.

The meeting is only one element in the equation for successful communications. While it is a vital part, it is truly the communications system more broadly where the real opportunity for improvement--and potential problems--occurs. There are some who say that most problems are related to communications types of issues. With the advent of computer driven communications linkages and systems, this will not become less complex--the challenges will be even greater. When we roll in concurrent engineering and launch strategies and challenges--all aimed at reducing lead times and increasing the tempo of all that we do, we simply must move more quickly and effectively in the broad communication arena. The discussion is not only about traditional meetings and communications. It is about team based meetings which may involve people at various global locations as well as one site, and is intended to focus on technical problem solving for quality and productivity enhancements.

If team meetings are properly planned and conducted, the team will be more productive, and everyone gains. If the team meetings are not well designed and organized, it is quite likely that we will not only be less than productive, we will probably not accomplish our mission. Part of the way we can assist ourselves in having good meetings is to follow a basic checklist of planning for the meeting. Typical questions to raise about the meeting are shown in the "team meeting planning checklist and record". As noted in the checklist, it is simply a systematic way of looking at each activity or item included in the meeting. Perhaps, as we plan the meeting, we may discover the meeting is not required. If we evaluate each item, and the overall mission of the meeting, we will not only help build a more effective meeting agenda, but we better focus teams. Focused teams can better attack strategic objectives organizationally.

Documentation of team functions may be an area which, at a glance, looks like we are wasting time. But when we must discover, often months later, who was to follow through on a given issue or topic, how we were going to move forward, and fundamentally what the conduct of the meeting was, we must have a record of what was done in the meeting. These may be minutes or follow-up reports, the record, a form of documentation which we must attend to. Similar to many other forms of documentation, meeting records provide:

1. Paper trail for all concerned.
2. Evidence focused on issues and concerns for internal and external customers.
3. Tracking mechanisms to evaluate teams.
4. Systems for follow through and discipline in teams and organizational affairs.
This does not necessarily mean recording actions of team meetings is easily accomplished. A recorder must be recruited or assigned, and accurate information placed in the record—based on an agenda. The record, following the agenda, will often be placed in a standard operating procedure form, or system, and may be projected as the form which is in the application section.

Communication For Team Meetings

Communication as discussed in the toolkit, is a rather basic approach, yet one which should prove useful for team applications. The sender originates a message, places it in some type code, and moves it forward. The code could be via a computer system in digital form, written by hand, verbally in words alone, or in other types of code. Once coded, and sent, the message is received and decoded by the receiver as information and understanding. Based on the information received and understood, various feedback and iterations may occur. Assuming we understood what the originator intended, as information, this could be a report, chart, manual or procedure. Typically, several iterative "conversations" are required before actual meaningful communication has been completed. It is also significant to note that this basic communication model can help explain both human and machine communication where the code may be electronic or computer language used to digitally communicate.

Listening skills. This was referred to earlier as total listening. We must recognize and understand that listening is required anytime you wish to communicate successfully, and certainly requires hard work. Examples of "listening" better include:

1. Handing off information in any written manner--was it complete and accurate?
2. Standard procedure or virtually any technical communication--is it actually clear?
3. Presenting formally or informally.
4. Solving the technical problem--did we all hear the same problem, causes, effects?

How frequently have we left a meeting with different understandings or thoughts--not on the same page? How do we encourage ourselves to improve on hearing accurately? It should be clear at this point that the fundamental relationship to documentation is that if it was not heard properly and accurately, it certainly will not be documented properly.

Selected skills we can use to listen better are:

1. **Repeating.** Repeat, looking for indications that we were or were not understood.
2. **Questioning.** Ask questions for clarification--"did you understand what I was trying to say?" This may also be termed paraphrasing, sensitively stating back to the originator what we think they actually said in a slightly different manner, questioning for clarification.
3. **Re-hashing.** Possibly asking others to re-hash what was said or presented--to listen back to what you or others said. Re-hashing is different from questioning and repeating since we "re-hash" issues and circumstances for virtually any reason or purpose, but primarily because we want to make sure people are "listening". This includes responding in non-judgmental ways by listening--not necessarily evaluating with comments.
4. **Knowledgeable previews.** Asking others knowledgeable to pre-review procedures and documents in written form to help assure that it works--asking others to "listen" to what we are trying to accomplish. This goes beyond proofing and entails a quality control type reading from the perspective of the customer.
5. **Targeted message.** Understanding the listener--do I have my message targeted adequately to meet the listener's needs--they are the customer in this case? Was the message tailored to customer needs and vocabulary?
6. **Gestures.** The way we use body language, both when listening to other presenters, or when we are the originators of a message, can be critical. This can also be pauses, silences, and other "pace of listening" concerns including good eye contact, facing the originator, and nodding in actually agreement.
7. **Personal effort.** Are we, as listeners, really working to try to understand what is being said? Do we have an open mind regarding the message? Are we trying to respond in a favorable manner? Are we discouraging interruptions? Some would call this active listening for total quality communication.

It should be obvious that the above approaches are not necessarily a linear system, or designed to be used in any single orderly manner. Approaches can be applicable in any order and circumstances.

Feedback for effective communication.
Feedback has been mentioned several times in the previous sections, and was a pivotal part of the model for effective communication presented at the outset.
of the tool. Feedback, similar to other communication devices and techniques, should not only be considered as a personal conversation or traditional listening approach. Feedback to written documentation can and should be necessary for improving the overall culture. Effective feedback addresses the questions which are naturally present in any communication circumstance. These will include evaluative issues such as "how are we doing?" and "how can I improve?" both aimed at assessing effectiveness for supportive and constructive types of reasons. Feedback requires thoughtful consideration:

1. **Timing.** If we do not provide feedback when requested, this will likely create obvious questions on the part of the originator. Try to be immediate with feedback--the longer we drag out our response, the more likely things will be forgotten or misunderstood.

2. **Specificity and detailed.** The more pointed the remarks, the more likely we avoid confusion.

3. **Growth and diplomacy.** Presumably we are wanting to help grow the recipient and others' in the communication loop.

4. **Supervisory relations.** Frequently, we will be giving feedback as a supervisor to a person or team. We must provide carefully balanced and respectful information for future relationships and sensitive issues.

Finally regarding feedback, this can be given as both the listener--presenter--originator, and as the listener--receiver, and other configurations as the iterative feedback and communications cycle becomes increasingly dynamic. Feedback is not simply a perfunctory communication requirement, but it is a necessary opportunity for improving our overall communication and documentation system.

**Presentations as a communication device.**

At some point in the team process, aimed at ongoing improvements, it will be necessary for all persons to make various forms of presentations. Like all forms of communication, and team effort, the presentation represents a focused work effort by the entire team. The presentation is a clear indication of how our team is, or is not, doing. The good presentation can make a poor team look good, and the bad presentation can make a good team look bad. Presentations are the culmination of various elements of our work, a natural coming together of all that we are about at various stages of development and evolution.

Presentation forms include spontaneous, semi-formal short, semi-formal long, group and formal:

1. Spontaneous presentations may need to be given on short notice to the team or individuals simply to help everyone better understand. We can do little to be prepared immediately. The way we conduct our daily affairs, particularly how we document on a regular basis, can assist in "carrying" a spontaneous presentation.

2. Semi-formal short presentations could be when the team plans a 5 minute report on a project status which you have been leading or involved with. Although short and only semi-formal, this presentation affords an opportunity to give forethought to how we put our ideas in front of recipients of our presentation.

3. Semi-formal long presentations could be a 3 hour team presentation which is an update or review of team findings with customers internal or external to the team. The way we present for 3 hours versus a 5 minute presentation will need to be carefully considered and observed.

4. Group presentations could be tied to other communications approaches, but require added planning and organizing of the information. Group presentations give a well rounded look at all persons' work--demonstrating all persons' role and capability.

5. Formal presentations include off-site customer reviews, conference presentations, formal project reviews for internal or external groups, individuals or customers, and so on. This may be tied to a written document relative to other forms of presentation.

The presentation is a report, relying on both verbal and graphic skills for putting information in an organized and appropriate manner. The presentation is more than simply delivering information at an anointed time. It is a persuasive delivery of the information which could have been delivered in other perhaps less creative ways--likely primarily written.

When we present, we are representatives of our team and organization, and essentially "selling" our view. We need to "perform" our information and view rather than simply "present". Slides, videos, electronic and flat over heads, computer interactive, film, and other electronic audio and video methods must be understood and considered as we try to put our ideas forward in competitive ways. This requires practice and considering numerous factors, many related to reporting and documentation in writing:
1. Learning to build and use good overhead transparencies, and reported information in other written forms—that is do we routinely use charts and graphs, and/or bulletized information which can be converted for presentation in numerous forms? Are we placing these in forms to be readily "tuned up" for formal or semi-formal presentations?

2. Building data and other systems to facilitate easy take off's of information for reporting and presenting in short notice—perhaps a computer question as well as one relating to documentation in written form. This is different from the previous point since we may have data or information in proper form, but not have media available or in proper form.

3. Getting in the habit of routinely disciplining ourselves to lead discussions, and the group, possibly in semi-formal ways which help us learn and practice the skills before we need them. This could include standing up and explaining who we are and explaining what we have done in some routine manner on a regular basis—possibly at the weekly team meeting. We can not wait to build confidence and skills until actually needed—this may be too late.

4. Disciplining our team and others in the organization to follow through with information and data, sufficient to enable putting everything together without being under duress at the last minute. Good presentations take time—we must allow sufficient time to get all information formatted, cleaned-up, proofed, and so on.

5. Bringing together talent and capability to prepare presentations. Not only do "high end" presentations require time to do—based on the original technical data and information provided by the team—but other technical talent and knowledge focused on hardware and software, generic to all information, clearly understanding various media to be used.

This relates to "infrastructure" of a reporting system.

**Organizing for presenting, communicating.** Regardless of purpose information must be properly organized for presenting and/or communicating. Whether a team only provides information in written form rather than verbal, we still must plan the approach for reporting. The basic approach places information in a multi-part system:

1. Introduction and overview.
2. Body.

3. Summary and conclusion.

This simple approach is nothing more than telling the audience what you are going to tell them, providing information you said you would do, and telling them what you have told them again. We must organize and follow through in a disciplined manner, done with an appropriate style and format.

The introduction and overview provides an organized discussion of the key topics of information which will be presented in the body of the presentation. It would also be wise to indicate any relevant introductory information at this point. This could include team makeup and deliverables, specific team individual roles, related requests from management and other teams and customers, and so on. The idea is to overview those elements of the project which were important, and drivers of the way we did our work, clearly affecting the outcome of the project which is being reported. We may wish to present this as the major objectives for the overall report, to be followed through on.

The body of the report or presentation would include that which was just introduced, following through on what was overviewed. Specifically, the problem and objectives would be detailed and explained, findings and analysis, and any detailed relevant information, would need to be provided in the body. Detailed documentation, drawings, planning information and other detailed and relevant project explanations would be provided at this point. All of this is introduced, at least in general terms, in the earlier section of the report or presentation.

The summary and conclusion of the project provides a "recapping" of all that was presented earlier. This now reflects back on what we set out to accomplish in the report or presentation, and only indicates that this is "what we did" earlier. This should be a summary of the major objectives we set out to address, as stated at the outset. We must detail any specific concluding elements of the report which were significant, from the body of the information in more extensive fashion, and now merely referred back to as the key deliverables from the project.

We should try to use our documentation and broader communication systems to capitalize on how we do our reporting and presenting. We should not have to create large amounts of information for presentations. This should be automatically available and manipulatable for final use for others. Findings and conclusions of teams will represent training materials for others, a hand off of information from one group to another, clearly affecting how we teach and learn culturally. This is where we must design
our broader quality system up front, to be amenable to facilitating findings and information well beyond only one report or presentation—if the information was worth pursuing, might it have value to others?

**Standing up and leading, presenting.** It should be recognized by now that when you are standing up and presenting, you are essentially leading. As you lead, and communicate, you are also teaching. Virtually everyone on the team and in the organization will need to do this eventually for one reason or another. It pays us to discuss some pointers for how to stand up and make a good presentation, based on written or other documentation:

1. **Give your name and role.**
2. **Be sure to stand up straight, look the audience in the eye, and do not wiggle, waffle, or shuffle—stand firm.**
3. **Speak clearly, enunciate carefully, and be loud rather than soft. Speak with authority, and have self-confidence.**
4. **State your role in the project and team, and indicate what your objectives for the presentation will be—do not just ramble.**
5. **Move through your information slowly but without dragging—be purposeful.**
6. **Work through well organized and bulletized information—do not use overheads, outlines or flip charts which have everything on them—key points only, to guide the presenter.**
7. **The typical overhead should have five or six key points and it should only be in front of the audience for 10 to 12 seconds—keep it moving.**
8. **When using overheads or other media, have some help which frees you up to concentrate on what you are supposed to be doing—presenting and persuading.**
9. **Do not wait until the day of the presentation or report to practice. Know how and what to do if something goes wrong or does not work.**
10. **Move through the plan in an orchestrated manner, work the plan, and if something goes wrong, simply keep moving.**

Good presentations and reports are almost always a healthy blend of written, graphical and spoken forms of media. Carefully design the information you wish to portray to help "spice up" the delivery without being extravagant or gaudy. Rely upon the talents of the team to bring together part of the mix of the presentation—use your best speakers at the start and finish to help drive points home, and others for explaining data and examples or prints and so on. We use our talents in ways which are complimentary to us as individuals and the team in totality.

**Team Synchronized Cross Functionally**

Synchronization in functions and groups, through teams, will not occur by chance or without a fair amount of effort. But the assumption is that it will require teams at all levels and in all functions, and likely different from what we have been accustomed to in the past. It is also assumed that increasing amounts of what we do will be at the team level, transitioning into virtually all being done in a team infrastructure in the future. The purpose of the current section is to help define what the infrastructure will look like and how we will use the mechanics of this new structure to work our organizational improvement for the future.

**Infrastructural issues, team opportunities and challenges.** The organization is changing and the team structure and behavior must be key to what is driving the change, helping to interpret changes in technology, changing customer demands, supplier relationships and so on. Yet this must all be synchronized at all levels and functions, and clear leadership will be required to improve and grow the group for the future. Questions would seem to revolve around size of the organization, type of teams, and how to organize to address opportunities.

**Size of the organization.** How big should we be or how big should we become? If we are too big, we cannot communicate effectively, yet if we are not large enough, we may not have the type of talent inherent in the organization to tackle the types of issues we must resolve. Moreover—and directly in contrast to the past—we must be as small as possible—lean and mean is the key. We simply cannot be larger than is needed since this defeats the opportunity to move quickly, and drive costs up.

Significantly, and consistent with our earlier technological change model, perhaps the key consideration regarding size is the nature of the technology driving the organization. We simply must have the technical talent required to service the technology and keep all aspects of processing under control. As the model depicts, we will want to be able to form teams consistent with our technical make-up, and look carefully at the technical support required to create quality products up front and well under control at the front line rather than having to create large groups to service the product after defects are discovered in the plant before ship or certainly after ship and we are in service. Technical
support comes, in part, from line persons and supervisors, potentially reducing traditional engineering, again via strong cross functions.

**Type of teams.** What types of teams should we form? Will we use one team as a permanent base for all day-to-day functions, and form special focused shorter term teams for issues and opportunities which come up? Like most organizations, probably the way this comes together will be based on numerous variables, most which we have little control over. It is a combination of elements from several past and present experiences and circumstances, and may or may not be done from an ideal "design" of how it should be done in the textbook sense. Three types of teams are presented, based on functional work teams and cross functional problem solving teams in both long and short term circumstances.

Teams are presented here as having three basic purposes, all impacting the overall design of the system. The basic purposes of teams are:

1. **Support.**
2. **Team learning.**
3. **Decision-making.**

Under any circumstances there will be these three ingredients built into the reasons and ways for doing teams. At various points along the way, all individuals and teams will need support, all must learn, and all will need to make or assist in decisions. As the organization matures and changes, the relationships, types and amounts of the above ingredients may change, but the need will remain.

**Functional teams.** The first approach is based on the assumption that what we do as an organization is to some extent governing how we should be organized. For example, if our function is to build a specific product, then we have talent and resources organized in such a way to facilitate the function. At a glance you may say that this is always the way we have done it anyway. But we should consider that in many cases we have allowed many factors to get in the way of defining what is actually needed to "get the product out the door". Personalities, politics, and other factors which may have led to a less than ideal situation may have caused us to end up with an organization which needs to be reorganized around functional work teams. The functional team is primarily aimed at support, and learning and decision-making to a lesser extent. While support is primary in the functional team, they must also make decisions and there will be learning going on.

**Cross functional short term problem solving teams.** Two types of problem solving team would co-exist along side the functional teams but would be formed as special circumstances deem it necessary. These are cross functional and oriented to the problem or opportunity rather than the specific function or process required ongoing. The basic cross functional short term team would function as a problem surfaces from customers internal or external. The strength of the short term cross functional team is that over a period of several months we can learn a great deal about a specific issue or concern. The design and systems approach for short term teams has primary emphasis on learning, and support and decision-making each taking a lessor role.

The short term team would require expertise from all parties concerned and would be dispersed at the conclusion of resolving or improving the opportunity which lead to forming the team in the first place. We may also have a standing group on call to support functional teams which identify areas of concern and opportunities for improvement.

**Cross functional long term problem solving teams.** The longer term cross functional problem solving team is oriented toward big projects which are designed to cause relatively long term impact on the organization. This would generally be oriented to new product development or re-engineering, but could include other strategic issues as well. It is also true that if we have had some type of significant perennial research and development type problem which has plagued our organization or division for many years, this team design may be applicable. The primary focus of the long term cross functional team is making broad and substantial decisions which will impact the organization for many years to come. This effort relies on information being collected routinely by functional groups. Problems arising from functional groups may be best solved by the information coming from those groups as well, passed on to cross functional teams. While it may be ideal to form a new team to focus on a problem as it arises, it simply may not be practical.

**Issues and opportunities in functions and cross functional teams.** Relationships inherent in using cross functional teams as needed for short and/or long term problem solving, along side functional teams ongoing, provides both issues and opportunities. Assuming the learning and teaching opportunities for teams come primarily through problems being tackled and solved, we would be silly to remove our day-to-day people from the mix. It would seem that we would want to place the people charged with functional operations in the mode of being challenged to stay current and ahead. It may make sense for them to be on the cross functional
team for solving problem? Will we duplicate talent if we do not use existing personnel from day-to-day operations? Talent we need for the team ideally resides in the day-to-day operating functional team.

If individuals collecting and massaging data and documentation daily do not actually use it for higher level problem solving applications, we will not get the full advantage. For obvious reasons dealing with integrity of data, if those collecting and massaging data and information can also be the ones requiring information over the longer term for higher level functions and applications in teams, we may see improvements in quality of data collection.

**Synchronization and leadership issues--giving birth to new products.** This relates to the issue of synchronization in information, functions and applications. It is one thing to organize the information at the team level to serve ongoing and necessary day-to-day functions. But it is another thing to use the same data and documentation to solve problems and issues which arise over time. This requires positioning team infrastructure to respond to daily operations first, and problems which emerge and require solutions immediately and longer term, second. We must transcend both essential levels and move into a third level of team opportunity related to product development and innovation, using information from other levels and functions.

If we are not looking down the road to future opportunities we are slowly going out of business. We must not become so caught up in the necessary day-to-day operations or the essential act of solving various sizes and types of problems, that we forget to give birth to new ideas and products for our future production. We have a third reason for teams, blended out of the foundations of the functional and cross functional teams used for other reasons. Synchronization of information and functions for solving problems and making improvements is the basis for the current tools.

**Electronic communication issues.** One of the newer phenomenon in the team and problem solving context is the issue of electronic conduct of team. Regardless of geography, distance, locations, and function, if properly wired into the project electronically, we can participate. Many organizations use intranets or the internet, or a network of their own configuration. When individuals send information or request it, or when we make our various contributions via e-mail, we can do it at any hour of the day and under various circumstances. Chat lines may be useful for focused time on task, and various exercises can be performed with software for brainstorming over a distance.

Teleconferencing can be used if it is important to see others you may be talking to, although the cost of this approach will rise. Increased flexibility and functionality in teams are available for enhancements in efficiencies and quality in operation.

**Moving Projects--And Teams--Forward**

Perhaps one of the first areas of concern relating to team based technical problem solving is the proposal for conducting the project. This originates the idea for a project and provides the official recognition that we need to get a team pulled together. But before we form the team, the proposal should be written, and put forward for review by various persons on a central team review committee. Team review committees could consist of representatives from each of the major technical areas where problems are likely to originate.

While it is the problem itself which generally drives the formation and composition of the team, all teams will have representation from quality, engineering and manufacturing. The origination of the team will be determined based on where the problem appears to reside. For example if the problem is a quality problem, a leader in the quality group could reach out and form a team of operators, engineering and other representation as appropriate.

Regardless of who initiates a team proposal, it should consist of the following, in written form:

1. **Problem statement and background.** What is a written description of the problem? Are there supporting drawings or data, or other background historical information, which can be used to assist in better understanding the problem. This should be viewed as necessary information to help get the team moving, and on the same "sheet of music".

2. **Objectives/possible solutions to be pursued.** What are the predicted areas of solution or objectives which we think will help solve the problem? These should be categorically, and numerically listed as separate areas to be pursued, even though they are likely related.

3. **Deliverables/measures of success.** How will we know what should be accomplished at the conclusion of various steps/stages of the project? These are part of the mechanism for evaluating our successful completion of the proposed project, and having some reasonable sense of when we are done.
4. *Timeframe for completion.* Placed in Gannt timeframe for completion, what dates are critical, and why, all related to the above listing of deliverables. If not shown in some sort of graphic, a simple listing of dates along side major deliverables should be prepared.

5. *Resources and budget required, likely payback.* Are any special resources required to test your predictions, or to complete the project? This includes fixtures, design work, purchase of special tools, or other specific resources. What budget projections are required to bring the project to completion, based on other requirements identified? What are prospects for paying back the investment?

6. *Recommended team composition.* Who should be on the team to address this project? While the proposer may or may not know specific persons to suggest for optimum project completion and problem resolution, they should be able to recommend whether maintenance, quality and others are involved.

7. *Rationale, and other important details and information.* What other information or details might prove useful to the team for completing this project in a timely manner?

Eventually, assuming the proposal becomes approved for pursuit, the proposal will likely be turned into a project plan by the team and others.

Following preparation by the initiator, the proposal could be turned over to the team review committee for consideration. Each proposal is reviewed and returned to the initiator in a brief time period. This process would also need to involve the direct line supervisor and other technical support in the organization. The initiator is notified in writing regarding the results of a proposal. Some proposals will be useful to pursue, but will require additional work to clarify details, obtain necessary information, and generally to get prepared, by the review group.

Alternatives to this could be situations where a customer driven complaint or problem has surfaced. In this case an individual or group may be assigned or formed based on their expertise and duties/functions. Or it may be that a standing technical core group remains on call for selected types of technical problems in some organizations. Various persons, based on the nature of product or service, will simply be "on call" to address problems and circumstances which require attention. Membership would be a part of the persons' regular work responsibilities, and not optional--similar to a customer service or field warranty group. Regardless of the nature of the group, or team, and what is driving them, it would typically be true that a cross functional group is most useful. This brings expertise together from various functions, enriching the overall depth and breadth for attacking a problem.

**Best practices, suggestion systems.** Increasingly, "best practices" and "suggestion systems" are being used for team approaches to technical problem solving. These are commonly voluntary, with fixed periods of service, rather than being ongoing, or rather than supporting multiple teams. Commonly focused on a specific technical problem or project, and formed within the system, they also often tap into external sources of expertise which may go beyond the immediate and available sources. As with most other approaches these obviously require various management levels of support for success, often at the supervisor's level as the first line of responsibility.

Typical roles and functions in the suggestion approach include levels of interaction to assure that ideas are moved forward in a timely manner for evaluation, possible funding and implementation:

1. Originator (team or individual).
2. Originator's supervisor.
3. External suggestion coordinator.
4. Implementor/originator.
5. Steering committee.
6. Team leaders/members.

Each of these functions will be discussed in greater detail in a later tool related to process improvement. Forms commonly used in the best practice/suggestion process are shown nearby. Although generally self explanatory as a "fill in the blank" exercise, these are addressed within the context of process improvement.

One additional approach for teams would be to treat them similarly to the former concept of department. Rather than becoming part of a department when joining an organization, individuals would join a team which becomes the point of their sense of being, and identity, within the organization--and certainly houses their work function. The team then becomes responsible for most worker needs, including training and education, benefits, and so on. More important, perhaps, for technical problem solving purposes, this becomes the fundamental driver of the team. Our basic purpose is to solve technical problems, and facilitate ongoing improvements in quality and productivity.
Forming, Launching, And Managing The Technical Team: Focused Project

At some point it will be obvious that a team needs to be formed to pursue a given project or opportunity for improvement. Who should be on the team? What should be the composition of the team, and how can we make it happen? These questions relate to the formation of the technical team for pursuit of a problem. In short, the composition and formation of the team will be a function of the nature of the technical problem or project being pursued. The mechanism for helping to pull the team together will be the team review committee.

Based on the nature of the problem, recommendations by the initiator, and input from others, the review committee will make suggestions and provide inputs regarding:

1. Possible team leadership.
2. Makeup of the team.
3. Which group should fund the project.
4. Possible level of funding for the project.
5. Others.

The review or steering committee provides additional deliverables or inputs which can enhance the likelihood of success of the project, in consultation with the proposal initiator, and others associated.

Assuming the team review or steering committee gives the "green light" to the project, and a team leader is identified, and consents to lead the team, the team would be called together. This should be considered a semi-formal process, with the possibility of the plant manager being briefly involved, as well as others who will be affected in some pivotal manner by the process. This is being done for several reasons, but obviously to assist in the broad communications, and resultant changes that are likely to occur down the road. It is also being suggested that leadership throughout the plant should know about teams being launched, as well as their overall progress over time.

At the project kick-off meeting, the technical team being launched will meet briefly with the team review committee to be guided on review dates, responsibilities and so on. For example, it would be anticipated that the team leader would be introduced, general deliverables and time frames targeted, and so on, to help all concerned move forward most efficiently. It is also clear who the key linkage is to the team review committee (likely the representative from the technical area which is funding the project) and when the review dates for the project will be.

While a general oversight function may appropriately be driven from the team review committee level, clearly, others must be involved and pivotal in the process. This involves leadership at all levels, but certainly at the highest levels of the organization. At some middle level, funding and accountability for deliverables will be important--if not critical. This may be the engineering or manufacturing group--to evaluate and put some new system in place. But if the upper and lower management are not tuned in, it should be obvious that the system simply cannot move forward.

After the official "launch" of a given project the technical team would begin moving forward to address the problem. Early in the process, it is important to consider reworking the original proposal to transform it into a project plan, providing all involved the opportunity to contribute and take ownership. As well, specific responsibilities may be assigned depending on numerous circumstances and variables. A primary reason for transforming a proposal to a project plan is to provide additional focus on problem objectives. This will be done using the cause and effect, and brainstorming tools as the basis for fine tuning what was already approved.

The team must take "ownership" of that which, at least theoretically, they have started--and must now finish. They need to further define and refine objectives, deliverables, timeframe, and so on, for the project, moving forward with steady progress. This cannot be done in a vacuum--it must be done in concert with funding group leadership, with the team review committee's general oversight and input, and with others who may have an interest in the process.

It is anticipated that specific objectives and deliverables will be identified, defined and written. These do not need to be lengthy, but they must be written and agreed upon, up front, as the measures of success upon which we will all gage our efforts. These become the points which we will look for as signs that we are on task, meeting all customer and supplier needs and demands. With the objectives clearly stated, the project plan can be rolled out, in terms of specific deliverables, or measures of success. Specific tasks are defined for each objective, persons and other resources assigned, and the activities, perhaps phased over time, and with appropriate project reviews, would begin.

Basic Team Skills
Several basic team skills can, and should, be practiced to enhance the likely success of the team. While some of this has become obvious throughout the current tool, and will be reinforced throughout the toolkit, it is also thought to be important to identify and explain much of this within the context of the current section. The skills identified and explained include rules, agenda, listening, and questioning.

**Rules.** Basic rules are fundamental to the team process, requisite to success of the team. Several of the other skills identified throughout the current tool and section may indeed provide indicators of rules which a team may use to govern itself. Commonly run in a democratic and participatory manner, the team requires:

1. One person speaks at a time--everyone gets a turn--but limited to 2-3 minutes.
2. Regular established meeting times, daily or weekly, are scheduled, as standing meetings.
3. When others speak, we listen--all persons are respected, regardless of views or ideas.
4. Minutes will be taken, and published and distributed for all team members, in a timely manner after the meeting completion, weekly. This can be done using a volunteer at a laptop computer--otherwise no one should be doing "other work" during the meeting.
5. All arrive and leave on scheduled time frame.
6. We will follow the agenda--typically of a standing variety, further explained below.
7. Ideas to be approved and moved forward must be presented in a written proposal format.
8. Team leader runs meeting (other designate).
9. Guests and visitors are permitted, but require prior approval by the team leader.
10. Formal presentations are limited to 10 minutes, unless prior approved.

Obviously, other rules could be added or those listed could be modified. This depends on culture, the group, nature of our product, and so on. But we must have rules to maintain a reasonable control and disciplined approach, if we wish to make progress.

**Agenda.** Agendas will generally need to be used with the team, if we wish to maximize the process. Yet for a variety of reasons, it is also likely that building a regular weekly agenda, unique to each session, will be unrealistic (assuming the team leader is a volunteer). What is recommended is a generic "boiler plate" agenda which can be used over time--a standing agenda, something like the following:

1. Opening, recognition of guests, visitors.
2. Announcements.
3. Updates on standing sub-committees/groups.
4. Updates on standing work items, past minutes.
5. Formal presentations.
6. Others, as needed.

It should be widely known that the weekly meetings will be only one hour, one and one half hours, or two hours in duration, as a standing item. The limited meeting allows all persons to schedule their lives and conduct their affairs. Regular weekly meetings must be scheduled as reasonable and "doable" for all, taking into account shifts, and all responsibilities.

**Listening.** Active listening skills must be practiced, and taught, on a regular basis, if we wish teams to be successful. Some will argue that total quality requires total listening. Listening is required anytime you wish to communicate successfully, requiring hard work. Examples of where most can "listen" better when communicating were offered earlier in the tool. Listening skills are not easy, and they require work. Other skills such as questioning and agenda, obviously also relate to listening.

**Questioning.** At the core of solving technical problems is the ability to ask good questions. Questioning not only indicates that we are listening, but it also indicates that we wish to move the team further in detail and focus. But questioning, like many other methods, requires skill and practice:

1. If I ask my question in a less than diplomatic manner, I may offend others.
2. If the individual or group being asked is not prepared for the question, it may result in an embarrassing situation.
3. If I do not have my facts straight, or poorly present the question, I may end up embarrassing myself or others.
4. Questions, if handled properly, can help others become better focused and to better understand their role and function--but again, these must be carefully handled.
5. Regarding customers, we must be able to ask good questions without appearing to not have our own "ducks in order".
6. Also regarding customers, both internal and external, we should ask questions before we are asked by the customer.

Asking good questions, like all else having to do with making improvements, requires work and planning together. Good questions do not simply happen, they require careful investigation and detailed analysis--skills which must be learned and practiced.
Cause And Effect, Brainstorming, Open Agenda For Problem Solving

Referred to as fishbone or Ishakawa diagramming, cause and effect assists in sorting out the root causes of effects in products, processes, and other quality related circumstances. This is a problem solving tool which assists in isolating actual causes rather than symptoms of the cause. With each new branch of discovered (identified) cause, additional roots can be sought, until the actual root cause is presented. This occurs when no further sources of potential or real cause can be identified, and is commonly not readily accomplished.

The main root of the diagram represents what is thought to be the main driver of the problem at a given point in time. As additional points of view are brought to bear on the main driver, or main effect as it is sometimes called, these may become additional drivers in the discovery of the actual root cause. Important "foundational" elements involved in the use of cause and effect tools are:

1. Identification of as many causes of one part of the root main effect as possible prior to proceeding to any of these individually. Each cause should be clarified and explained to make certain that all persons understand precisely what is being addressed. This involves tapping a broad base of persons for information--and inclusion on team.

2. After each sub-cause has been identified, it may be important to treat each of these as the effect and further identify root causes, continuing the evolution of multiple branches of the diagram. In other words, the structure allows and encourages multiple iterations of the process. This, of course, is part of the reason we use cause and effect tools--because it provides the structured and disciplined process and mechanism to help pursue and flush out details about the issue under study. This is repeated until no additional causes or effects can be identified, getting to the root of the actual problem through the process.

3. Each cause and effect should be questioned to determine applicability to the actual root cause or problem to be solved. This is the so-called "five why's". It is pivotal that these drivers and effects be flushed out through iterations and brainstorming. The further we go in the "why" process will impact on the overall integrity and robustness of deliverables.

4. It is very important to have ground rules and leadership for your team--to be elaborated on in some detail below. This is critical for purposes of bringing discipline and systematic efficiency to the process. The cause and effect process will break down into a "gripe" session if not for effective ground rules. This also requires strong leadership--critical to help keep the process on track and productive.

5. Some type of weighting system may be applied to the effects to determine what knowledgeable persons perceive to be the main effects--and possibly the actual problem. Weighted values can be placed next to the causes and effects on the diagrams. This will be discussed later as a "multi-voting technique.

6. It is important to gather additional data and/or information to support or refute a given cause or effect. This should become a routine part of the overall process. Even if not pursued directly as support or for refuting, data and documentation collected will be useful and necessary in many elements of the problem solving process as well, a part of our culture.

Even though it may require several brainstorming sessions to flush out the important effects, let alone the actual cause of the problem, much can be learned-and solved--about a given problem, in this manner. In fact, the beauty of the tool is likely its ability to encourage free-thinking, and innovative solutions or partial solutions to emerge in a rather rational and systematic manner. But this can also be a potential weakness, since it can be a misguided "black hole" of effort directed in the wrong direction if we are not careful. This speaks to having systematic rules and approaches to the use of tools in disciplined ways.

What is the "systematic and disciplined" approach to conducting the cause and effect process? How would we best pursue this in an organization for the process to become a productive and useful output, leading to ongoing improvements? The following steps are used in some form for cause and effect:

1. Identify a leader. As with most other team functions, someone will need to lead the process--and organize a structured approach something like follows in the subsequent steps. This person may be a team leader, a supervisor, and operator, an engineer or technician, or others. We must identify a
leader to help flush out the critical details and information vital to the process.

2. **Provide a problem focus.** A brief problem statement should be listed on the side of the sheet, providing group focus as well as a startup point for the discussion—that is, someone will need to kick it in to high gear—the problem statement can help. It is worth noting that the extent to which we take the time to try to assure that we have the correct problem focus may be critical in the overall process. As in all technical situations, understanding a problem is 50% of the battle.

3. **Identify major causes.** Major likely root causes associated with the problem must be shown on the form as categories to be followed up on during the process. While these will generally be unique to the team, the product, organization and so on, it is also true that the categories of man, machine, method, materials, measurement, and environment are the commonly identified areas for pursuit.

4. **Brainstorm.** Based on the major categories identified above in point number three, systematic brainstorming sessions must be conducted to "flush out" the root causes related to each of the major cause categories identified. This will be facilitated where proper ground rules exist, such as: each person has a turn, offer one thought at a time, do not criticize ideas, do not discuss ideas during brainstorming, build on each other's ideas, allow team members to pass, and record all ideas for subsequent discussion—these are at the core of the disciplined approach.

5. **Clarify each cause.** Based on the root causes and other information which is flushed out, further diagrams and cause and effect activity may be needed to clarify each area of pursuit. This is a primary act of further definition for team members' benefit, to lead to enhanced communication among and between individuals, teams, departments and so on within the organization. The point is, we do not want to mis-communicate on issues and circumstances up front in the process, leading to problems in the process down the road. Also, if an area of possible pursuit can be eliminated through "up front discussion" rather than sending people off to research it, or gather information, it will likely help protect the integrity of the system—we do not want to waste time if at all possible.

6. **Collect data.** Even though this may appear to be a time consumer, the fact is that during most technical pursuits it will be necessary to gather data for optimum root cause analysis and problem solving. In the long run, if data can be gathered in a timely manner, and related to the iterative processes involved with cause and effect analysis, it will likely save time and help us all make better decisions.

7. **Use multi-voting.** Structured multi-voting should be used to identify the most likely causes. It should be recognized that this is only one method for prioritizing the causes for further pursuit. But some systematic method should be developed and used by teams to help know which causes to further investigate and pursue over time—even for further cause and effect analysis. Several ground rules may be applicable. At the outset begin a listing, allowing each person to circle the items they deem important—items getting relatively high votes are still in the running. Second and subsequent votes allow the team a number of votes equal to one half of the remaining items. This should be repeated until the list consists of between three and seven items. These will be the most important priorities for team pursuit—the significant root causes.

8. **Collect additional data.** Depending on the significance of the overall circumstance, and the problem being addressed, timing of the situation, among other things, it may be important to gather additional data. It would be highly unlikely that this would not have to be done on technical situations involving our suppliers, customers and so on. This tool fosters efficient total involvement of persons in the organization, particularly on the team, because it keeps all persons focused on the issue(s) at hand. It also discourages finger pointing and finding blame, since the majority of the group energy is drawn to positive and pro-active elements in the discussion rather than negative baggage of the past.

The cause and effect tool also helps prevent problems from recurring in several ways. For example, finding the root cause in the first place will tend to help eliminate the problem altogether up front, thus reducing the likelihood that the problem will resurface. Assuming someone is assigned to follow-up on the root causes, and report back to the group at some future date, the likelihood of recurrence is reduced once again. Since we have all been involved in the broad discussion and focus
group through our team effort, we have now been further educated from several cross functional perspectives, enhancing the possibilities for opportunities to nip this problem in the bud.

Through the method, several possible/likely causes are identified that can be resolved over time. Even if each of these were not the root cause, the opportunity for improvement was improved since we probably did not recognize each cause before we used the cause and effect tool. Teams will believe they can solve problems for improvements.

Simply identifying and articulating the problems for corrective action may be a substantial part of the actual corrective action program. Simply figuring out what the actual problem is for action, may be the most important part of the problem solving process. Cause and effect process is important if for no other reason than to help in the identification and formulation of the problem. Far too frequently groups or teams simply cannot get off dead center, because we do not actually understand what the root of the problem is.

The actual plan of attack for solving or resolving the problem should begin to be formulated in the actual raw process of cause and effect. When possible root causes are being flushed out by various team members from their multiple approaches and cross functional perspectives, as a group, we should begin to see various avenues for pursuit. As the possible root causes are massaged, we should begin naturally articulating this into a plan of attack, or over time, a project plan for the team or individuals related. This may be effective short term planning and corrective action on any number of root causes which have been ailing over time.

We should also be able to "backward plan", using our paper trail of activity in the cause and effect process to feed into strategic planning and other important future orientations for longer term improvement. Consider the power of involving customers and suppliers in the process, bringing their ideas and "demands" into the flow of information. Cause and effect can be a key source of information for long term strategic planning and improvement, both directly in the process, and by studying and analyzing results in documented form over time for "voice of the customer and process" direction.

**Problem solving and brainstorming for improvements.** Part of the systematic method for making ongoing quality improvements is effective problem solving. While it is true that it is less effective to solve problems which enable "putting out fires" rather than affecting proper long term decision making, it is also true that technical problems must be solved on a regular basis in organizations. Eight steps can be identified for problem solving. A brief explanation of each step includes the following:

1. **Identify the problem.** The theme or problem is related to objectives to be accomplished or specific problems which have arisen.
2. **Set parameters.** What are the reasons why the problem was selected. What is the problem? What are the expected results? What is not the focus of the problem?
3. **Analyze the problem.** This analyzes through organization of different parts of the problem and its sub components--cause and effect.
4. **Preliminary ideas selection.** This identifies possible remedial actions and alternative solutions. Selection of the best plan based on various inputs and information occurs.
5. **Decision identification.** Putting the best alternative into action.
6. **Analyze decision.** Comparison between original plan (or targets) and actual results in value terms to the organization.
7. **Prevention.** This step provides action to prevent recurrence. This may mean standardization of necessary steps or establishment of procedures and training.
8. **Future planning.** Remaining problems, and current solution analysis/impact cause reflection on next planning stages and how to approach.

Relationships to previous information provided as broader causes and effects are acknowledged.

The brainstorming function is an idea generating activity which is usually conducted in groups of 3-12 people (although this can vary). The basis for brainstorming is that groups typically can be more creative and productive relative to an individual based on a synergistic affect. Human imagination applied to a problem with some reflection and freewheeling assists in the success of brainstorming. It is necessary to have a group leader to help focus, and some method for documenting ideas generated, and a relatively comfortable atmosphere and agreement on the topic or problem. The problem focus provided through previous steps identified should be used wherever possible.

When the process is actually being conducted all members should be encouraged to participate, providing only one idea per turn (to help avoid anyone dominating the process). People should be sequenced regularly to help provide ideas, and no criticism should be allowed. The following "idea
"spurring" questions should be asked to assist in generating "free wheeling" and creative ideas:

1. Can the unit be put to other uses? Are there other uses if modified—or if not?
2. Can a unit be adapted? What else is like this?
3. Can we modify the unit or component? Can, or should we, change meaning, color, motion, sound, odor, taste, form, shape?
4. Can we add to the unit or component? What to add? Where? Should frequency, strength or size be increased?
6. Can we substitute? What else? Other plans?
7. Can we rearrange? What else? Other plans?
8. Can we reverse parts or components? Opposites? Turn backwards, upside down, inside out?
9. Can components or parts be combined? How about a blend, assortment?

While other questions can assist in enriching and guiding the brainstorming process, the above points should aid in moving the process forward.

If the problem is not clearly isolated and understood, we are less likely to be able to address the actual root causes. The problem may be at least half way solved when it is thoroughly identified and stated, with all of its details and documentation. Based on a clear understanding of the problem, it may require several brainstorming sessions to flush out the important effects, let alone the actual cause of the problem, much can be learned—and solved—about a given problem, in this manner. The beauty of the tool is encouraging free-thinking, innovative solutions to emerge in a systematic manner.

**Open agenda meetings.** One of the techniques, related to cause and effect and brainstorming methods, which should be used as teams mature, is termed the open agenda. This allows the team opportunities to address items and areas which may not otherwise come up, and do it in a fairly systematic and disciplined manner. At some point in the life of the team it may even become the primary tool for organizing and guiding the team efforts, including follow through on activities and issues. The team or team leader requests items for action which may not have originally been part of the problem focus or agenda. This allows "openings" in an otherwise structured approach, and permits persons to bring new findings forward for the group benefit.

**Predictable Phases Of Team Behaviors, Maturation, Growth**

Several behaviors and team phases of maturation and growth are identifiable. These are important to understand since, if mis-handled or not properly managed, it can have a negative impact. The negative impact can be noticed in many ways:

1. Team members not cooperating.
2. Team members dominating, controlling.
3. Team members not doing their fair share.
4. Politics being used inappropriately.

Other scenarios can be presented and discussed regarding team behaviors. The purpose is to present and discuss the typical maturation patterns teams go through. This is designed to aid team leaders, facilitators, supervisors and others in better managing the overall efforts. The phases are defined as forming, norming, storming and performing.

**Forming.** The forming stage is obviously that point in a team's existence where it is beginning. Members are rather cautiously trying to determine what their and other persons' roles are and why they were placed on the team. Boundaries of group behavior are explored, and a transition from individual to group status is occurring. Testing of people and infrastructure is part of the behavior. Lack of cooperation may occur due to feelings of excitement and anticipation, yet most will also be optimistic. People will typically be proud to have been asked to serve on the project, but there may also be fear and anxiety about the job ahead. Due to the nature of the early stage of the team, it is difficult to be productive as a unit for this period.

**Storming.** The storming stage is a critical growth period for the team. Persons must push the leadership of the team, trying to establish their own power base, and look as if they as individuals are the more powerful and influential. Leadership must react with patience and care, recognizing the best way to behave is to have a structured and disciplined approach to all that is done. The natural infighting which occurs can be quite detrimental to the team if it is not held in check and controlled. Talents of the team will begin to be identified naturally, and they must be further groomed and directed for the collective good. This is the period where actual productive outputs can be noted based on the
"leveling" of the team, and a collective vision of what we are about is emerging.

**Norming.** The norming stage provides a plateau of growth as individuals and as a team. Persons are increasingly comfortable with their roles on the team. People are beginning to feel comfortable as members of the team, and they can accept and give criticism constructively. As the team continues working out differences, the effort increasingly is moved from lack of cooperation to one of cooperation and production. The team has accepted its identity and ground rules at this point, and are quite comfortable working together. Loyalties and responsibilities of the team are resolved, and people begin to take serious ownership in the overall design of their project.

**Performing.** The final phase of the team behavior is what is termed performing. This is the productive stage of a teams' effort. Relationships have been settled, expectations are understood and accountability is built in. Team members tend to be satisfied with their team performance, and constructive self growth and change is apparent and appropriate. The team has become a cohesive and effective unit by this stage. This will be observed because the team is able to get significant amounts of work accomplished. This has implications for how we structure and manage teams and the extent we are able to observe and circumvent negative elements determines overall competitiveness.