LEADERSHIP & SUCCESS
In Economics, Law, & Technology

Society or external interactions

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Dream Point Publishers
Tulsa

Leadership & Success
In Economics, Law & Technology
Society or external influences

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Cover Design: Rosemary & Marcus O. Durham
Cover photo: "Epitome of Society", US Capitol in Washington, DC
taken by Rosemary Durham
Printed in United States of America
First printing by Fidlar Doubleday, January 2005
Second printing by Fidlar Doubleday, January 2006

Library of Congress Control Number

ISBN: 978-0-9719324-7-6

TO

Pettie Beason Durham, my Mom, who taught me by getting things done while others were thinking about it.

In Memoriam:
William O. Durham, D. Min., my Dad, who taught me about leadership through example, before I knew its importance. During his youth, because of the Great Depression, he only went through the eighth grade. At age 79, he completed his Doctorate.

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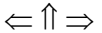
PREFACE

Everything we know is developed from something we have read, heard, or seen. Therefore, these other thoughts necessarily influence what we write. To the best of our knowledge, we have given specific credit where appropriate.

Rather than footnotes or references, we have listed the works that have provided significant information in one way or another, since this is often in concepts rather than quotes.

Statements that are attributed to us are things we have used commonly and do not recall seeing from someone else. Others obviously have similar thoughts. If we have made an oversight in any credits, we apologize and we would appreciate your comments.



LEADERSHIP & SUCCESS SERIES

Thought
People are where they are
because of the choices they make
MOD

Where we are going _____

How vast is the topic of *Leadership and Success?* How can you benefit from skills in leadership? Can there be success without leadership in some area? Are the principles the same for an individual, a group, or a society? Are the practices the same for an individual, a group, or a society? Is this a topic that can be taught or is it something that is innate? How do you define leadership? What is success?

These are just some of the questions answered in the series on *Leadership and Success*. The topic is too broad for a single book. A series of three volumes provide the foundations for continued personal development and growth.

Each book in the *Leadership & Success* series addresses a different group of topics, each related to your success as a leader. The structure of this series is based on the three areas of leadership involvement: internal development, horizontal interactions, and vertical relationships. The progression of the three books is arranged in the order in which you, as a leader, can have the most impact: people, organization, and society.

The first book, on relationships and communication, deals with individual relationships and how others perceive you. These chapters are primarily involved with areas that you can impact

directly. Relationships and communication is most interesting and intriguing. Think about it. Everything we do is defined by how we interact with others, while the topic of communication includes everything from individuals to presentations and visual cues.

The second book, on organizations, culture, and ethics, deals with the makeup of a venture or association. These chapters are primarily oriented toward optimizing the performance within a group that may be global. Think about it. Our culture is defined by how we interact with others, while the topic of organizations includes everything from businesses to social groups and even families.

The final book, on economics, law, and technology, concentrates on the influences of society and groups outside your sphere. Society includes everything that is outside of an organization. Economics impacts the amount of money in your bank account. This book has practical, day-to-day keys that you can use to make your venture successful.

How is the best way to use the series? Because each is a stand alone work, they can be used individually or as a group. The method depends on the forum and the needs.

The books are structured for seminars as well as personal study. The chapters are configured for a one to one-and-a-half hour discussion. By completing all the activities, most chapters can require three to four hours. Although the combination of books makes an excellent text for a technical and engineering management course or executive development programs, they are beneficial to anyone desiring to improve.

These topics will be approached from the context of communication and relationships, and will follow closely the principles developed in the first book in the series. The remainder of the books will discuss components of leadership and management, and will include people relationships, organizations, and the tools necessary for success. The topics, then, will include both the application and implementation elements of a successful leader or a manager.

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1

QUALITY

Thought
The marketplace does not tolerate dishonesty.
An inferior company in any area will be driven out.
MOD

Excellence

What is quality? Is it better for the organization or the customer? Who is responsible for quality? Is there a cost associated with improved quality? When is good enough, okay? Does everyone want quality?

Quality involves technical, economic, and legal issues. It is a component of risk management, which includes safety, environmental, and quality. Project management can be described as the trade-off between time, money, and quality. It is very obvious that quality is a major factor in every organization

Various names are used to describe the practice of pursuing quality. It may be called total quality management (TQM), quality control, quality assurance, continuous improvement or variations of these names.

Quality is excellence.
- MOD

Dr. Bruce Ewing has an admonition that reflects quality. [Ewing] It is the very definition of being exceptional.

> Step out and be different.
> - Dr. Bruce Ewing

Quality is the decision to obtain excellence. Quality is simply doing what you say you are doing. That is the same definition that was used earlier for integrity.

> Quality is integrity.

Notice the relationship.

> Quality is the major part of equality.

Quality vs quantity demand

Project management has been described as the tradeoff between time, money, and quality.

How does that correlate with the concept where quality is excellence? Lesser quality can be obtained for less money. In some instances, there is a conscious decision to spend less money, and therefore to accept an item of reduced quality.

Dr. Paul Zane Pilzer in *Unlimited Wealth* discusses the relationship between quantity demand and quality demand. He argues that there is an insatiable appetite from customers. First customers want a quantity of items. Then after obtaining some number, the customer then begins requiring improved quality.

His theory has been demonstrated in this country with the introduction of new products, which are often little more than Beta test versions. After consumers have one of the product, they begin to want higher performance. It has also been observed in developing countries. First people just want anything. Then as that market begins to develop, they are willing to import higher quality.

The development of technology drives quality demand.

History

Much of the technology advances that affect our daily lives have been precipitated since World War II. That conflict caused several changes in the world scene.

First, it brought countries around the world into an alliance. For example, Japan and the United States did not have a particularly good relationship previously; now those two countries are allies on many fronts. Second, it created superpowers that had the money and resources to pursue technology. The space race was impetus for much of today's electronics and health development. Third, nations that had previously been focused on less than economic development had a chance to start their economies from scratch. Notably, Japan and Germany were destroyed and rebuilt with new technology under the direction of United States financing and technology support.

These new societies first were subservient, then became partners, and eventually entered into friendly competition. Bowles and Hammond in *Beyond Quality* describe the events. [Bowles] From 1950 to 1980 the United States share of the worldwide automobile market declined from 76% to less than 21%. Of the radios that were sold in the United States from 1955 to 1975, the percentage that were manufactured domestically declined from 96% to near 0%. In the 1980's, the United States share of the worldwide semiconductor market declined from 60% to 40%

Part of the picture comes from the quality of the product. Joseph R. Jablonski in *Implementing TQM* gives statistics about the state of manufacturing. [Jablonski] Eighty percent of the automobiles from a Ford line went immediately to a rework facility in 1974. How much did that cost? In 1978 Ford Motor Company sold steel from its mills to European countries, while purchasing steel for its automobiles from Japan. Eventually, it closed its mill.

Hewlett-Packard, a long time electronics consortium purchased memory chips in 1980. Initial tests had a failure rate of 11 to 19 failures per thousand for US manufacturers and 0 for Japanese manufacturers. Infantile tests after the first 100 hours of use had similar comparative failure rates. The US chips failed at a rate of 27 per thousand while those manufactured in Japan had less than 2 failures per thousand. During that period, Japanese quality was more than an order of magnitude better.

> The marketplace does not tolerate dishonesty. A company inferior in any area will be driven out.

General MacArthur

How were the 'new kids' able to compete so quickly? Interestingly, General Douglas MacArthur is the answer. At the end of World War II, he was given the responsibility of administering Japan's redevelopment. He brought in Dr. W. Edwards Deming, a physicist and statistician with the US Department of Agriculture.

Deming had a reputation within a rather limited field in the US. However, he quickly became the guru for the Japanese economy's development. He developed the idea of continuous improvement and placed responsibility on the managers with the workers as part of a team. His philosophy is what became so admired about Japanese companies. What an opportunity to prove your worth by developing the economy of an entire nation.

Dr. Deming was still virtually ignored until he was 80 years old. In 1980, an NBC News White Paper television documentary "If Japan Can … Why Can't We?" made him the recognized guru of quality. [NBC]

> Survival is optional
> - Dr. W. Edwards Deming

W. Edwards Deming

Dr. Deming in *Out of Crisis* described 14 points for transformation of management and transformation of American industry. These principles apply to any organization or individual that is in the pursuit of excellence. We added the italics as a memory aid.

1. Create constancy of *purpose* toward improvement of product and service, with the aim to become competitive and to stay in business and to provide jobs.

2. *Adopt* the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.

3. Cease the dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by *building quality* into the product in the first plaice.

4. End the business of awarding business on the basis of price tag. Instead, *minimize total cost*. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.

5. *Improve constantly* and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.

6. Institute *training* on the job.

7. Institute *leadership*. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.

8. *Drive out fear* so that everyone may work effectively for the company.

9. *Break down barriers* between departments. People in research, design, sales and production must work as a team, to foresee

problems of production and in use that may be encountered with the product or service.

10. *Eliminate slogans*, exhortations and targets for the work force asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the work force.

11. *Eliminate* work standards (*quotas*) in the work place. Substitute leadership. Eliminate management by objectives. Eliminate management by numbers, numerical goals. Substitute leadership.

12. *Remove barriers* that rob the workers of their right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality. Remove barriers that rob people in management and in other departments of their right to pride of workmanship. This means abolishing the annual or merit rating and management by objective.

13. Institute a vigorous program of education and *self-improvement* for everyone.

14. Put everybody in the company to work to accomplish the *transformation*. The transformation is everybody's job.

J C Penney

J. C. Penney was an early American entrepreneur. [Penney] He began a chain of department stores that has survived over 100 years. He opened his first store in Kemmerer, Wyoming in 1902. He delivered an address to his new employees about 1902. It is an excellent, concise model of pursuit of quality.

> My Newly Acquired Associates:
> My talk to you this evening is to be very brief and very much to the point. The name of our store is "The Golden Rule Stores." The policy upon which we expect to build is just what the name implies.

> Do unto others as you would have them do unto you. I think I need say no more, because in those few words, I have said much. If a business can be built on the principles of the Golden Rule, and I firmly believe it can, we shall go forward and some day we shall add to this one unit another store and another store, and some day we might have as many as ten stores. Right here I want to emphasize this: treat our customers all alike and treat them as we would like to be treated as a customer. We will sell for cash only, thereby avoiding losses through credit; we will have no delivery system, so we can pass this saving on to our customers. We will have no expensive fixtures for which we would have to go in debt; we will pay cash for all our merchandise so we can take advantage of all discounts and not have to pay interest. We will buy only good merchandise to sell to our customers. Because of all the advantages that will be ours, we will sell for less and never will we sacrifice quality for an unreasonably low price.
>
> This is my brief story in a simple and plain language. Now as you go forward tomorrow serving our customers, and the opportunity presents itself, tell them what I have said and tell them in such a way that they will understand we have opened a new kind of store, planned and designed to render service unprecedented in the history of merchandising. Solicit their continued patronage on the Golden Rule Motto.

"The Penney Idea" is a declaration of ethics and purpose that Penney wrote in 1905 and was adopted by the J.C. Penney Company in 1913. The seven principles continue to guide the company today.

1. To serve the public, as nearly as we can, to its complete satisfaction.
2. To expect for the service we render a fair remuneration and not all the profit the traffic will bear.
3. To do all in our power to pack the customer's dollar full of value, quality, and satisfaction.
4. To continue to train ourselves and our associates so that the service we give will be more and more intelligently performed.
5. To improve constantly the human factor in our business.
6. To reward men and women in our organization through participation in what the business produces.

7. To test our every policy, method, and act in this wise: "Does it square with what is right and just?"

Other quality gurus

Joseph M. Juran wrote the Quality Control Handbook in 1951. It has numerous updated editions. [Juran] Juran was with Western Electric a subsidiary of AT&T, the communications giant. He followed Deming to Japan in 1956. Juran's contribution to the Japanese economic machine was transferring focus from technology to concern for the overall product management.

Armand V. Feigenbaum wrote Total Quality Control. [Feigenbaum] He was with General Electric, the electrical manufacturing giant. He coined the term total quality control.

Philip B. Crosby was with ITT and the Martin Corporation. In 1962, he delivered the Pershing missile system on time and with no defects. [Crosby] "Zero defects" has become the standard objective for many organizations.

Motorola Corporation, not an individual, initiated the 6-sigma program. The objective is to develop a manufacturing process that produces products with defects six standard deviations to the right of mean, or 10 parts per million. The industry standard is about three sigma, or 3 parts per thousand. Motorola is well toward the standard and has seen millions of dollars of savings.

What is good enough

> If it ain't broke, don't fix it.
> - popular adage.

Contrast that with Dr. Deming's philosophy.

> Improve constantly and forever the system of production and service.
> - Dr. W. Edwards Deming

There is a tension about quality. What is good enough? Is 99% performance acceptable? That will get a student an A in any class.

At 99% we would

- Have unsafe drinking water only 3 or 4 days a year.
- Have electricity outages only 15 minutes per day.
- Have all telephone service out 5 minutes per day.
- Have computers and other electronics shutdown 15 minutes per day.
- Have only 100 airlines that did not reach their destination each day.

Consider six-sigma. Assume there are 1 million cars driving in a city. That implies there will be 10 accidents.

Is that adequate? No! Society has moved to where perfection is expected. Anything less is an irritant that is not tolerated.

From these discussions, we find there are four fundamentals to total quality management.

1. Continuous improvement in the process
2. Focus on the customer
3. Teams are crucial.
4. Management provides leadership, support, and active involvement.

It is not a complex process. It does not require a large number of calculations. It is a desirable process. It does require commitment from the team and management.

> The objective of a quality program is to grant every person in the organization responsibility and authority for quality. Management provides the support to make it happen.
> -MOD

The model of quality is a bottom up structure. It is the antithesis of most organizations. The economic benefit to the organization more

than pays for any incremental cost associated with continuous improvement in quality.

This philosophy of consistent performance has prompted the development of international standards. The purpose of standards is not to tell in detail what to do, but to assure consistent results. If something goes awry, there is a process to handle it. The development and implementation of standards will be addressed in the next chapter.

Tools

Traditionally, quality has been addressed from the perspective of statistics and probability. That is great for an engineer or mathematician, but is less comprehensible to the tradesman or the people that are less technically trained. It is not necessary to use those techniques to track quality.

Data is available in every organization that reflects the quality of the process. Since the newer standards are more focused on following a process and customer satisfaction, there is less necessity for mathematical analysis. Nevertheless, charts are very beneficial to describe events tied to quality improvement. Charts illustrate trends much clearer than words or numbers.

Dr. Deming discussed two types of causes for deviation from the desired. These are special and common causes. Special causes are fleeting events that are controllable. Examples are operator error or a machine out of adjustment. These are correctable by a single person.

Common causes are inherent in the system and are uncontrollable by an individual employee. These are things such as wear, or the process being out of control.

Even when a process is in control, there are some variations about a reference value. To determine if a process is in control only three terms are needed, the reference value, the upper limit tolerance, and

the lower limit tolerance. These limits are typically three-sigma, which represents three parts per thousand. A closer tolerance objective is six-sigma, which is a maximum of 10 parts per million.

As it turns out there are only a very few control measurements that are used for reference values. The table lists all possible variations, broken into two sections. Variables include measurements such as size. Attributes are a ratio of defects per items.

Variables		Attributes	
x	Mean	*p*	Proportion defective / batch
R	Range	*np*	Number defective / batch
s	Standard deviation	*c*	Number of defects / batch
M	Median	*u*	Number of defects / unit

Charts

Control charts are made with one of these items as the reference value. A nominal value for the reference is ascertained, and the upper and lower limits are calculated. The data are plotted as the reference value. If the values stay inside the limits, the process is in control. Typically only one or two reference variables are used for a particular process evaluation.

A process can go out of control in one of two ways. The mean can begin deviating out of control in one direction. This will happen with gradual wear on a part. The other is for the swing to be out of limits in both directions.

After establishing a mean, upper limit, and lower limit for data, it is unnecessary to monitor every item. Samples can be made from the production. It is important that the samples be taken in some regular fashion, such as every X minutes, or every Y parts. The tolerance for each of these samples is plotted on a trend. The direction of the data can be extrapolated to apply to all the components from that same production run.

Once the data is gathered, the type of chart used to display the data tends to be at the preference of the creator. In a spreadsheet, the type of chart used can be changed with only a couple of clicks.

A *histogram* is a bar graph of a frequency distribution. The widths of the bars are proportional to the classes into which the variable has been divided. The heights of the bars are proportional to the frequency of the class.

A *Pareto chart* is a bar chart in which the bars are arranged in a descending order of their occurrence or length. This is similar to a histogram. Its major benefit is illustrating the things that impact the project the most.

A *run chart* is a timeline. It is a line graph that shows data points plotted in the order in which they occur. They are used to show trends and shifts in a process over time, variation over time, or to identify decline or improvement in a process over time. They can be used to examine both variables and attribute data.

A *scatter diagram* is also called an XY chart. It is used to interpret data by graphically displaying the relationship between two variables.

Brainstorming

Many non-numeric practices are used to develop a plan and to compare alternatives.

> Practices are many, principles are few.
> Practices may change, principles never do.

Four techniques are commonly used, brainstorming, flowcharting, positive-negative lists, and benchmarking.

Brainstorming or dream sessions are used by many groups in a variety of situations. The basic approach dates back at least to

Benjamin Franklin and his Junto. [Junto] The details of Franklin's organizations were described in the second book [Durham].

Brainstorming is an excellent way to develop creative solutions to a problem. The process is to focus on a problem, or opportunity, and come up with very many radical solutions or potential actions.

An individual can brainstorm on his own. He will tend to produce a wider range of ideas than a group session. He does not have to worry about other's egos or opinions. However, he will not be as effective, since he does not have the group experience.

A group brainstorming session must be operated with a few guidelines. The list is compiled from a variety of sources. It may vary some from other lists, but it is effective.

1. Define the problem to be solved clearly.

2. The session should be focused on only one problem at a time.

3. No one may criticize or offer an evaluation of an idea. If they do, they are penalized. Ben Franklin invoked a small pecuniary penalty for infractions of direct contradiction, one upmanship, and negative attitude.

4. Attempt to get everyone to contribute and develop ideas; however, do not force responses from individuals.

5. Welcome creativity. Have fun. Ideas may range from practical to wild.

6. Keep the train of thought moving.

7. Encourage piggyback, developing ideas from others.

8. One person notes the ideas of everyone on a visual display.

The ideas are evaluated after the session. Any results or practices that are implemented are reported back to the group with appreciation for their contribution.

Positive-negative lists _____

Positive-negative lists are simple tables of the pros and cons. They are used in situations from sales evaluation, to project design, to quality comparison. In reality, in every circumstance, the list contrasts the quality of the concept.

The procedure is very simple. Create a table. Divide it down the middle. List all the positive benefits of the idea. List all the negatives. Place items on the list as they come to mind. Continue filling out the list until there is a predominant side. Compare the pros and cons of the situation, and make a decision either on the expectation of good results, or the avoidance of bad results. The simple number of positive or negatives is an excellent indicator of the better choice.

Often it helps for someone to ask questions as an aid in developing the list. Questions bring in new concepts and ideas.

Positive	Negative
1.	1.
2.	2.
3.	

Some ideas may seem more important than others. Adding two more columns to the list can compensate for the relative weight. One column is adjacent to positive, and one is adjacent to negative. Then place a weighting factor for each item in the list. Sum the positive weighting factors and the negative weighting factor. The larger number is the winner. This procedure is also called force field analysis.

Over the years of use and evaluation, it is usually found that the shear number of items on each side of the list is as good an indicator

as can be found. The weighting factors are often arbitrary or based on less than complete analysis.

Benchmarking

Benchmarking is a method of comparing the processes and performance of one system against another. It is a common practice for comparing the performance of computer programs. It is also used to determine which business practice is best. A benchmark is considered the standard of excellence or world class.

F. John Reh is a technical and business consultant and is a contributing author to *Business: the Ultimate Resource*. [Reh] He has an interesting question about benchmarking.

> Benchmarking is the process of determining who is the very best, who sets the standard, and what that standard is. In baseball, you could argue that seven consecutive World Series Championships made the New York Yankees the benchmark.
> If we were to benchmark "world conquest", what objective measure would we use to compare Julius Caesar to Adolph Hitler; Gengis Khan to Napoleon? Which of them was the epitome, and why?
> - F John Reh

Actually the process of benchmarking is quite simple. It begins with a list of the criteria that are to be compared. It often is a very short list with only three to five areas of comparison. Then the processes being evaluated are ranked on the comparison. The process with the highest total number is the benchmark.

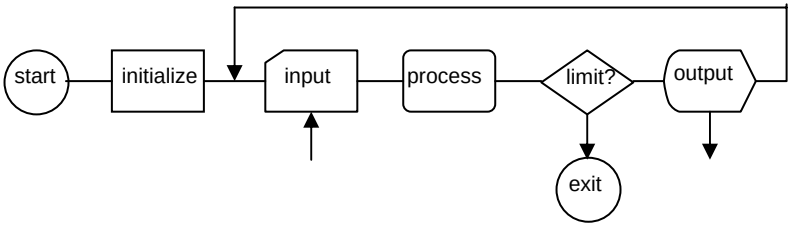
Several assessments were used in the chapter on leadership styles in the first book of *Leadership and Success* series. The form and technique is benchmarking.

Flowchart

Flowcharts have been associated with computer programs since their inception. They can be used as a graphical representation of

any process. A flowchart illustrates the sequence of events and all the decisions that are made.

Every process has seven components. The flowchart below is used in the chapter on negotiation, from the second book. It adequately describes the sequence of every process. Standardized symbols are used to aid in recognition of the diagram.



Flowcharts are an integral component of ISO 9000 quality standards. [ISO] Flowcharts can be used for many purposes.

- They can document processes and interrelationships.
- They can identify paths and alternatives.
- They can identify problem areas.
- They can be used with a total system, subsystems, or individual processes.

ISO 9000 standards

What are quality standards used for? What is ISO? Why would an organization want to use ISO? Is 9000 related to 9001?

ISO is the abbreviation for the International Standards Organization, a worldwide federation of national standards bodies. In the US, the standards group is the American National Standards Institute. [ANSI] ANSI approves consensus standards developed by various industry and professional organizations such as the Institute of Electrical and Electronic Engineers and the National Fire Protection Association.

These standards are agreed upon by the organization and are not developed by government agencies. Therefore, they are more responsive to technological changes. The standards are often adopted by various government entities. Furthermore, since they are the consensus of the industry they have a de facto legal status, particularly in tort law.

ISO 9000 and related standards are quality management standards. They are designed to assure consistent quality and to evaluate customer satisfaction.

The fundamental method of the ISO 9000 process is as follows. First develop the procedures required by the organization functions and record them. The ISO 9000 certification process is simply to determine if the organization is doing what it said it was going to do. It does not assure the best quality or the cheapest price. It simply assures consistency.

Three things are derived from ISO 9000 compliance. First, it assures consistency of process. Second, it provides a procedure if there is deviation from acceptable. Third, it provides consideration for customer feedback.

The next chapter relates a very fundamental illustration of what an ISO compliant procedure might look like for a small consulting firm. This is not a certification procedure, but includes the key components that would be necessary if certification were pursued.

Review

Quality is excellence. Quality is integrity. Quality is performance. People move from quantity to quality demand. J. C. Penney was one of the first leaders to publish advocacy of quality. Dr. W. Edwards Deming formalized the process just after World War II in Japan. His procedures finally became accepted in the 1980's in the United States. Quality demands continuous improvement. Nothing less is acceptable. Charts and numeric tools are frequently used for evaluation of quality. Non-numeric practices are used to develop

alternatives. International standards are now used as the basis for a quality program.

Application

1. Who is the customer?
2. Collect two pieces of data (a pair of numbers) on a student, process, or product. Collect and correlate the data compared to time. Create a summary table of the data and time.
3. Use the data to plot a control chart, histogram, Pareto chart, and scatter diagram.
4. Develop a flow chart for completing a homework assignment.
5. Develop a positive-negative chart for taking a personal development course.

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2

ISO 9000

Thought
Quality is the major part of equality.
MOD

Certification process

What is ISO? How do international standards affect my enterprise? What is necessary to be certified?

The requirements of ISO 9000 certification are completely spelled out by ANSI standard Q9001 [ANSI]. After reading the document a common question is "What do I do with that?" This chapter will provide an illustration of a standard for a small company. This can be expanded as required for larger firms.

Remember the fundamental theory of the standard is to provide a guide or checklist to see if the organization is following procedures. It is not a detailed or itemized list of everything that is done within the organization.

The quality program system usually consists of three sections.

1. Quality Policy Manual.
2. Operating Procedures/Flowcharts
3. Records.

The *Quality Policy Manua*l section describes how the quality program is to be administered. Its format and contents are specifically spelled out in ISO 9001:2000.

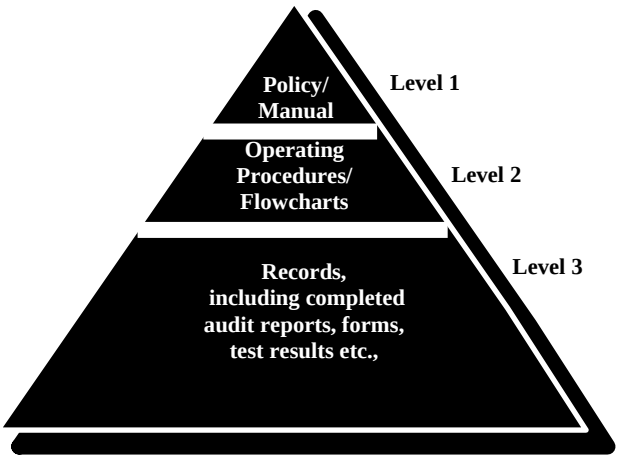
The *Operating Procedures* section consists of flowcharts or work instructions/drawings etc., describing how to do each segment of the quality program. It consists of seven to twelve procedures specified in the ISO standard. These procedures may be an addendum to the Quality Policy Manual, or may be contained in a separate book.

The *Records* section consists of completed audit reports, completed forms, test results etc., which demonstrate that the system works and is effective, or shows areas that need attention to improvement. Each audit document can be on the back of the procedure page.

When an audit is performed, the audit document is filled out. This then becomes a record of the quality program. It is maintained as verification that the program is continually improving.

A complete quality program is illustrated in the subsequent sections. Although there may be more detail desired for some organizations, this program covers the basics. The Quality Manual is a combination of Quality Policy, followed by Procedures, and Records.

Typical Documentation Structure



Quality Manual

Policy Statement

Our objective is to meet or exceed the requirements of our clients while making money for both the client and our company.

Scope

The quality system described within this manual establishes the total organization quality policy. The manual as written addresses the requirements of ISO 9001:2000

Objective

The quality objective is to reduce the incidence of nonconformance and convert it into continuous improvement of products and processes.

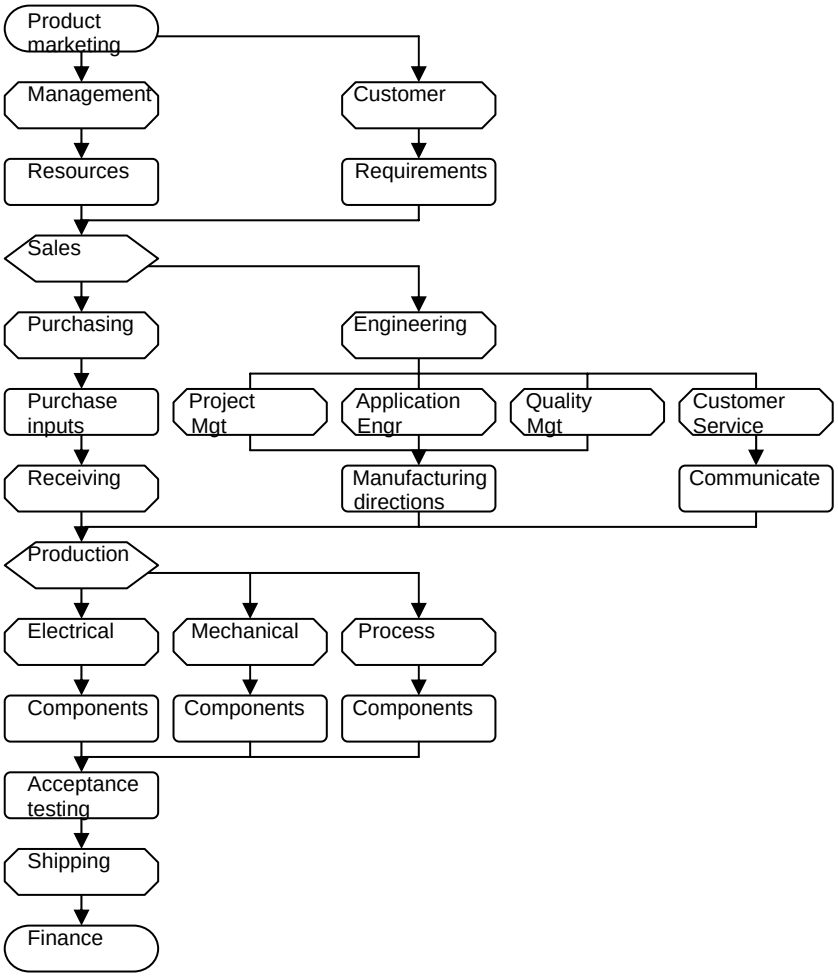
Issue Status

This document has been issued electronically and is controlled in electronic format only. Any hard copies of this document are therefore uncontrolled.

All employees and contractors shall be required to comply with this Manual.

Marcus O. Durham *02/24/04*
President Date

Quality Management System Flowchart



PROCEDURE: Document Control

Ref #: MDP 001 Rev #: A

Amendment Record

REV	Details of Change	Date
A	Issue for initial content	02/24/02

Approved by: *Marcus O. Durham* Date: *02/25/04*

Scope

This procedure shall be applicable for the control and review of all documents associated with the quality program.

General

The following documents shall be created and controlled in electronic format:

- Procedures MDP 001 – MDP 009
- Audit forms MDA001 – MDA009

The documents have been issued electronically and are controlled in electronic format only. Any hard copies of the document are therefore uncontrolled.

***

PROCEDURE: Records Control

Ref #: MDP 002 Rev #: A

Amendment Record

REV	Details of Change	Date
A	Issue for initial content	02/24/04

Approved by: *Marcus O. Durham* Date: *02/25/04*

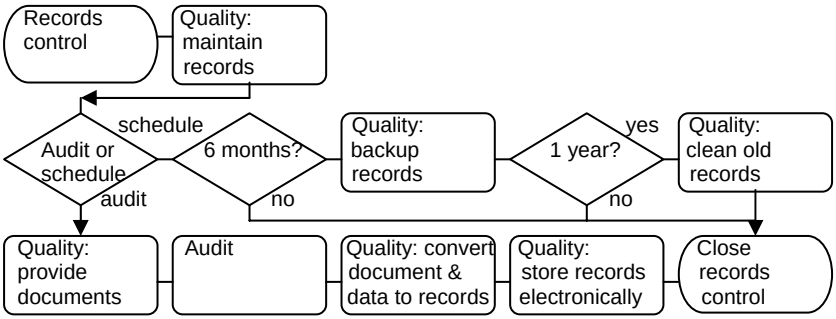
Scope

This procedure shall be applicable for the control and review of all records completed for the quality program.

General

Records are documents with data. The records shall be created and controlled in electronic format only. These electronic files will be duplicated and stored in a backup computer disk at 6 month intervals. All records will be maintained for a minimum of one year.

External documents from customers are stored when received. Paper documents are filed and electronic documents are kept in a file.



PROCEDURE: Internal Audit

Ref #: MDP 003 Rev #: A

Amendment Record

REV	Details of Change	Date
A	Issue for initial content	02/24/04

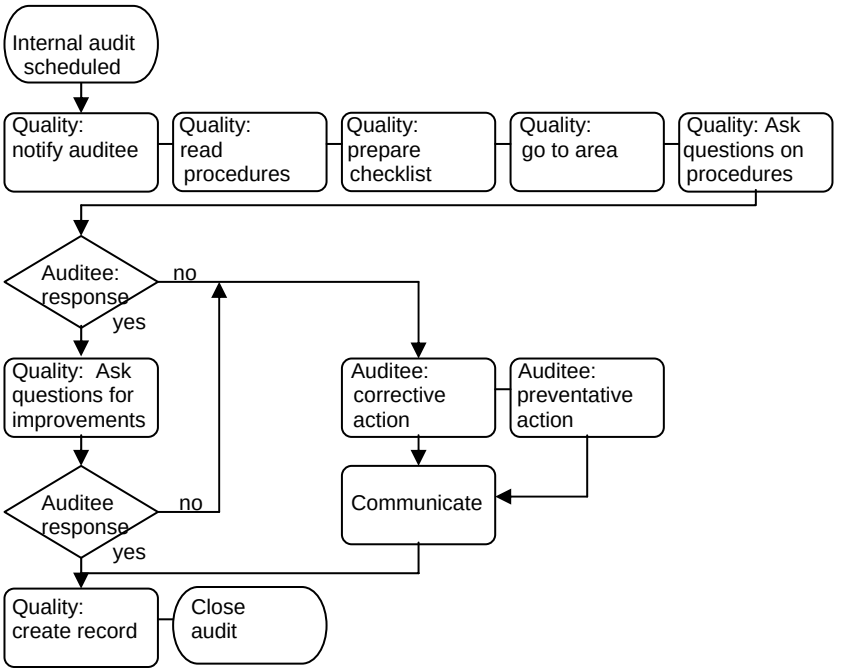
Approved by: *Marcus O. Durham* Date: *02/25/04*

Scope

This procedure is conducted to verify that the organization has addressed what it said it was going to do. There are three objectives.

- Have 6 months of records on file.
- Look at procedures (flowcharts) of each element.
- Look at records.

KISS: Keep it simple, Sam.



PROCEDURE: Non-Conforming Products Control

Ref #: MDP 004 Rev #: A

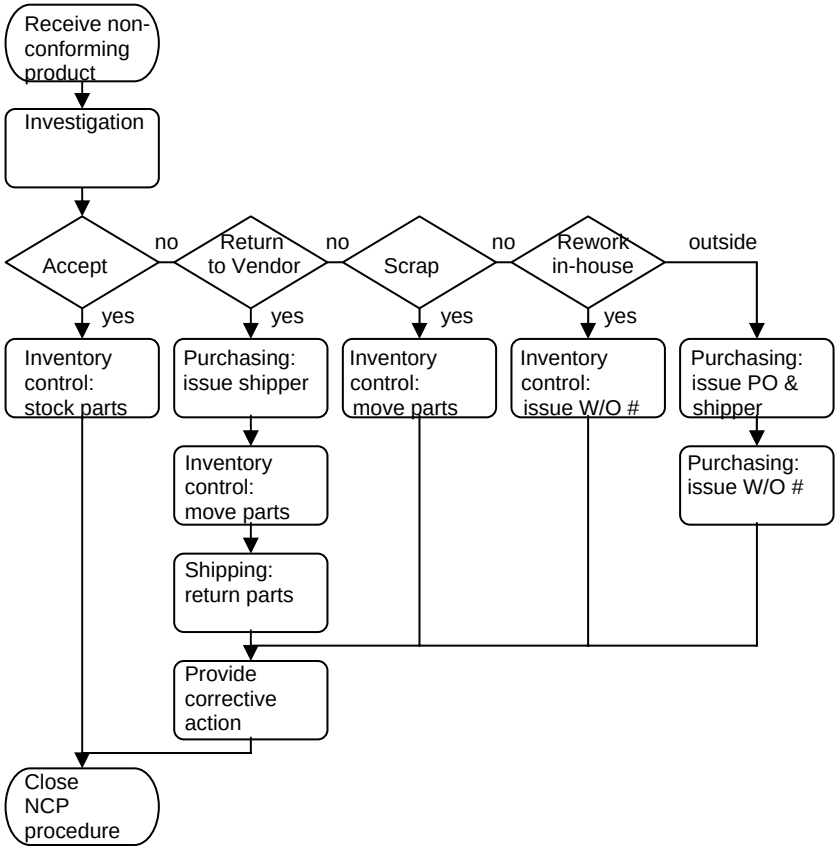
Amendment Record

REV	Details of Change	Date
A	Issue for initial content	02/24/04

Approved by: *Marcus O. Durham* Date: *02/25/04*

Scope

This procedure shall be applicable for the reporting and review of all non-conforming material.



PROCEDURE: Corrective Action

Ref #: MDP 005 Rev #: A

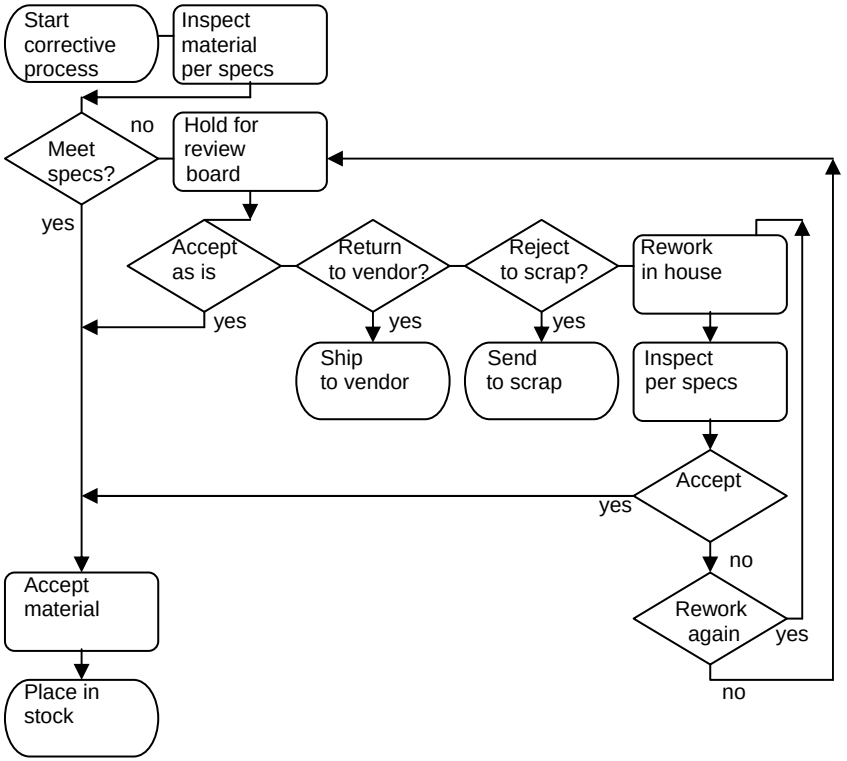
Amendment Record

REV	Details of Change	Date
A	Issue for initial content	02/24/04

Approved by: *Marcus O. Durham* Date: *02/25/04*

Scope

This procedure shall be applicable for the control and review of all corrective actions.



PROCEDURE: Preventative Action

Ref #: MDP 006 Rev #: A

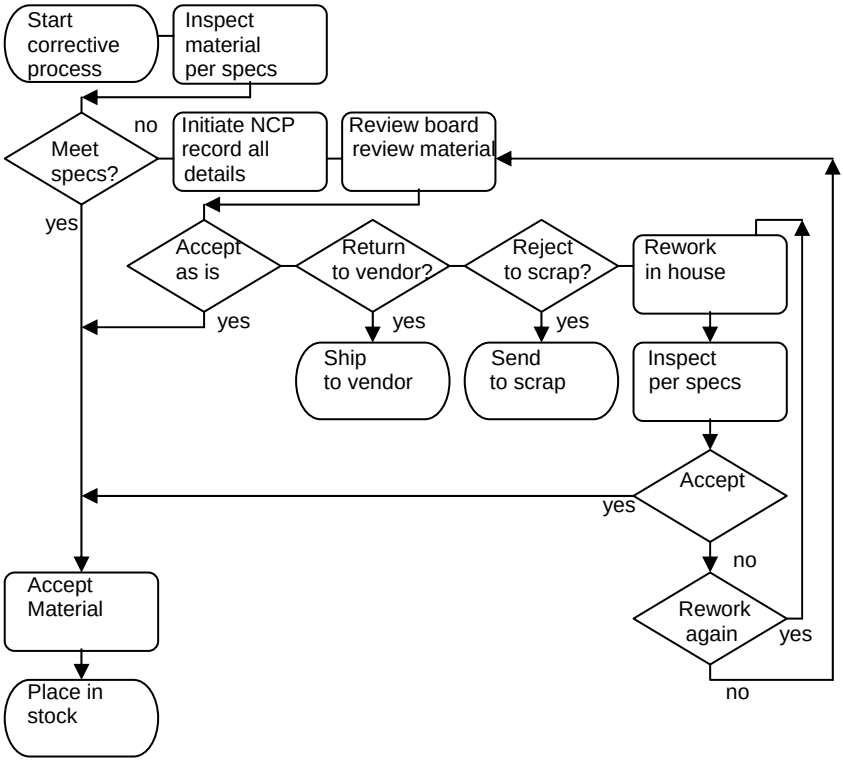
Amendment Record

REV	Details of Change	Date
A	Issue for initial content	02/24/04

Approved by: *Marcus O. Durham* Date: *02/25/04*

Scope

This procedure shall be applicable for the control and review of all preventative actions taken to improve quality.



PROCEDURE: Design Control (Engineering)

Ref #: MDP 007 Rev #: A

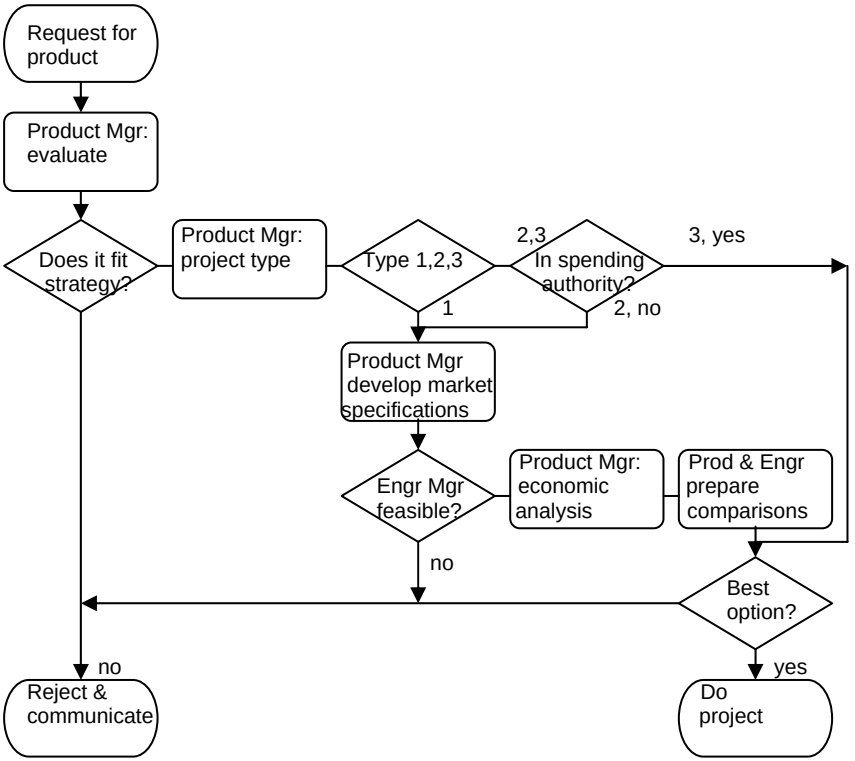
Amendment Record

REV	Details of Change	Date
A	Issue for initial content	02/24/04

Approved by: *Marcus O. Durham* Date: *02/25/04*

Scope

This procedure applies to all engineering and services requests.



PROCEDURE: Management Review

Ref #: MDP 008 Rev #: A

Amendment Record

REV	Details of Change	Date
A	Issue for initial content	02/24/04

Approved by: *Marcus O. Durham* Date: *02/25/04*

Scope

This procedure shall be applicable for the management review of all documents and records associated with the quality program.

Process

The management team shall periodically review input and output of the quality program. This will be at least annually.

Performance and opportunities for improvement are determined by reviewing the following inputs.

- Audit results
- Customer feedback
- Process conformance
- Status of carryover action items
- Quality management system changes.

The output from management review includes these actions:

- Quality management system improvements.
- Improvements on products associated with customer requirements.
- Improvements of services associated with customer service.

***

PROCEDURE: Human Resources

Ref #: MDP 009 Rev #: A

Amendment Record

REV	Details of Change	Date
A	Issue for initial content	02/24/04

Approved by: *Marcus O. Durham* Date: *02/25/04*

Scope

This procedure shall be applicable for the control and review of human resources documents associated with the quality program.

General

The technical professionals shall regularly attend training classes and conferences commensurate with maintaining professional licensing and certifications. These requirements include local, state, federal, and professional organizations. Records shall be kept on file for the appropriate license.

When outsource is used, look at the resume, client list, rate schedule, and insurance.

***

PROCEDURE: Customer Satisfaction

Ref #: MDP 010 Rev #: A

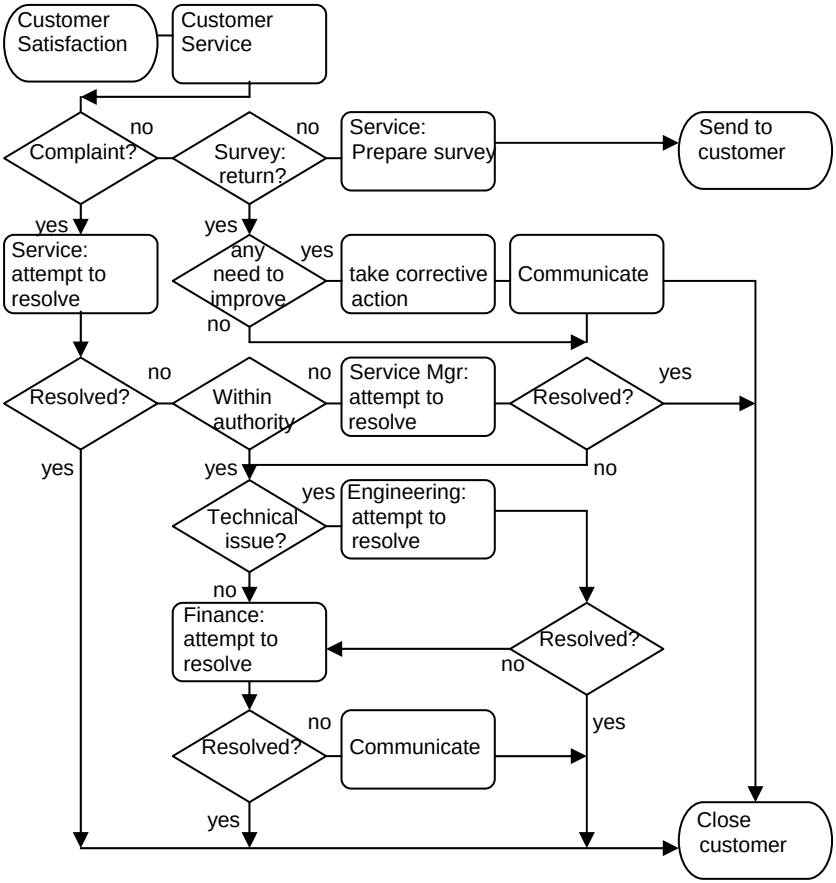
Amendment Record

REV	Details of Change	Date
A	Issue for initial content	02/24/04

Approved by: *Marcus O. Durham* Date: *02/25/04*

Scope

This procedure shall be applicable for the management review of all documents and records associated with the quality program.



Customer Satisfaction Survey

Dear customer:
Thank you for your business. To provide you with the best service, we have established an ISO9000 compliance program. We appreciate your completing this brief survey and returning it.

Is our service technically competent?	yes		could improve	
Are our people professional?	yes		could improve	
Is our service cost effective?	yes		could improve	
Is our service on time?	yes		could improve	
Does our service meet your quality expectations?	yes		could improve	
Would you use us again or recommend us?	yes		could improve	
Comments:				

Form 100 Request for Corrective Action: No._____

Resulting From: ( ) Audit ( ) Defect/Reject ( ) Customer Complaint ( ) Other

Part "A" Non-Conformity/System Deficiency: Completed by initiator and acknowledged			
Dept./Vendor:		P.O.No/Job Ref:	
Details of Non-Conformity or System Deficiency:			
Issued by:	Date:	Acknowledged by:	Date:

Part "B" Proposed Action: To be completed by Dept./Vendor Rep.		
Proposed Action:		
Dept./Vendor Rep:	Action Party:	Completion Date:

Part "C": Follow -up and Close-out: To be completed by Quality Manager or ISO 9000 Program Manager	
Corrective Action Verified: Signed:_____ Date:_____	Corrective Action Outstanding: ( ) Escalate to General Manager ( ) Suspend from Approved Sub-Contractor List Signed:_____ Date:_____
Remarks:	

Form 101	**Audit Checklist**

Activity/Procedure	Reference No	Date	Audit Reference

Ref:	Activity	Yes	No	Remarks/Observations/Comments

Form 102 Internal Audit Report

Location or subject audited:	Reference documents:

Activity Audited / Procedure Paragraph Number:	Request for Corrective Action No:
Total No. of RCA's	

GENERAL OBSERVATIONS:

_____
_____
_____
_____
_____

A copy of the Audit Checklists is attached.

Date of Audit: _____ Auditor(s):

_____

Audit Report reviewed and accepted by:

_____ ISO 9000 Manager

Form 103	**Customer Complaint Advice**	**No._____**

Part "A" : To be completed by initiator and acknowledged by Dept. or Vendor Rep.			
Customer:		P.O.No/Job Ref:	
Details of Complaint:			
Issued by:	Date:	Acknowledged by:	Date:

Part "B" Proposed Action: To be completed by Dept./Vendor Rep.		
Proposed Action:		
Dept./Vendor Rep:	Action Party:	Completion Date:

Part "C": Follow -up and Close-out: To be completed by Quality Manager or ISO 9000 Program Manager	
Corrective Action Verified: Signed:_____ Date:_____	Request for Corrective Action raised: YES / NO RCA No._____ Signed:_____ Date:_____
Remarks :	

Circulation: ( ) RCA Master File ( ) Action Party ( ) Management /Vendor Rep
( ) Audit File ( ) Vendor File

Form 105 Employee Orientation Training Record

Employee Name:	Social Security #	Department:
Job Title:	Supervisor Name:	Date:

(i)	Working hours
(ii)	Overtime payments
(iii)	Holiday entitlement
(iv)	Absence from work
(v)	Pension scheme
(vi)	Termination of Employment
(vii)	Disciplinary Procedures
(viii)	Grievance Procedures

Terms and Conditions including the above have been reviewed and accepted:
Signed:_____ Employee
Signed:_____ Supervisor

(i)	Job Description
(ii)	Tour of premises
(iii)	Introduction to personnel
(iv)	Disciplinary Procedures
(v)	Grievance Procedures
(vi)	Safety Manual
(vii)	Quality System

The above topics and activities were discussed and carried out by the employee and supervisor:
Signed:_____ Employee
Signed:_____ Supervisor

Initial Training Requirements:
_____
_____
_____
Signed:_____ Employee
Signed:_____ Supervisor

INSTRUCTIONS: Please *print in ink*.
(1) The header information must be completed.
(2) Complete appropriate section and obtain all signatures
(3) Record educational data on department matrix
(4) Return completed form to Human Resources Department

Form 106 Employee Training Record

Employee Name:	Social Security #	Department:
Job Title:	Supervisor Name:	Date:

Date(s) of training:_____

Details of training attended:_____

Location of training:_____

Name and title of tutor:_____

Qualifications gained:_____

Signed:_____ Employee
Signed:_____ Supervisor

Details of Further training requirements:
_____

_____

_____

Signed:_____ Employee
Signed:_____ Supervisor

Planned training schedule:
_____
_____
_____

Signed:_____ Employee
Signed:_____ Supervisor

INSTRUCTIONS: Please *print in ink*.

(1) The header information must be completed.
(2) Complete appropriate section and obtain all signatures
(3) Record educational data on department matrix
(4) Return completed form to Human Resources Department

Review

ISO 9000 is the international quality standard. This chapter has illustrated a complete implementation of the standard for a small company. Procedures use flowcharts or written description to tell how a process is accomplished. Forms are blanks for guidance. Once a form is completed, it becomes a record that is controlled.

Bibliography

- ANSI/ISO/ASQ Q9001-2000, *Quality Management Systems-Requirements*, American Society for Quality, Milwaukee, WI, 2000.
- Griffin, Neil, "Developments in Quality Management," Presentation at University of Tulsa, March 2004.

⇐⇑⇒

3

LAW AND GOVERNMENT

Thought
Government by the People,
for the People, and of the People
Abraham Lincoln

Tradition _____

What is the basis for law? What is different about the US system and other representative governments?

Society requires standards of conduct for acceptance within the group. When the standards are recorded and enforced for the good of society, these standards become law. The structure that society uses to develop, enforce, and interpret the laws is called government.

The system of laws in the United States is unique in its treatment of individuals. It is based on the English legal system, but is substantially modified by the United States Constitution. The US Constitution, at it's founding, created a government that was run by the citizens, rather than the lives of the citizens being run by the government. It dictates that everyone is subject to the same set of laws. As stated in the United State's Declaration of Independence from England, all men are treated the same under the law.

> We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these rights are Life, Liberty and the Pursuit of Happiness.
> - US Declaration of Independence

One of America's greatest leaders, President Abraham Lincoln, in his Gettysburg address, referred to this system.

> Government of the People, by the People and for the People.
> - Abraham Lincoln

In order to understand the American system of laws and government, it is important to investigate the history of laws that lead to this unique system.

The Babylonian ruler Hammurabi created the first recorded code of laws in about 2000 BC. The fundamental premise was an eye for an eye and a tooth for a tooth. This concept survived into the English Common law, and was often the basis for early US legal decisions.

About 500 years later, the Egyptian and Jewish ruler, Moses, recorded the Ten Commandments. They are concise laws of relationships. Unquestionably, they represent the traditional, fundamental philosophy of English, and as a result, US legislation and court decisions. These ten laws are not arbitrary, and they do not change. They are the foundation of success.

The Ancient Greeks are generally credited with creating the basis for the Western legal system, of which the United States is part. This legal system was based on an elected representative form of government. Aristotle wrote his history on the Athenian Constitution.

> Now the ancient constitution, as it existed before the time of Draco, was organized as follows. The magistrates were elected according to qualifications of birth and wealth. At first they governed for life, but subsequently for terms of ten years. The first magistrates, both in date and in importance, were the King, the Polemarch, and the Archon. The earliest of these offices was that of the King, which existed from ancestral antiquity. To this was added, secondly, the

> office of Polemarch, on account of some of the kings proving feeble in war… The last of the three offices was that of the Archon…. The Thesmothetae were many years afterwards, when these offices had already become annual, with the object that they might publicly record all legal decisions, and act as guardians of them with a view to determining the issues between litigants.
> - Aristotle

Under the Greek system, the legal and religious traditions were intertwined. There was one king, in position of a figurehead, for enforcement of laws and religious traditions. The Polemarch was specifically responsible for military activities, and as a result would operate to physically enforce the laws. This office was an extension of the king's duties, rather than an area with separate authority.

There were nine Archons, responsible for creation and modification of laws. The Archons would physically live together in one building, Prytaneum, and had exclusive control over the constitution, and establishment of not only civil law, but new religious traditions.

After some time, the Thesmothetae were created in order to interpret the laws. These "judges" would sit together in the Thesmotheteum, would hear arguments from those with a grievance, and pass judgment when citizens had differences of opinion under the law.

These Greek offices translate directly into the system of government incorporated in almost the entire western world today. The King is now referred to as a President in the US system or a Prime Minister in a Parliamentary system. The Polemarch can be translated into the bureaucracy in place to enforce the laws. In the US, this is referred to as the *Executive* Branch.

The nine Archons of Athens has grown into the Congress of the US government, or Parliament in other representative systems. Their responsibility is to create new laws, adapt old laws and modify the constitution as necessary. This is the *Legislative* Branch created by the founders.

Finally, the vast arrays of judges that interpret laws and decide who is correct in a dispute are the modern translation of the Greek Thesmothetae. This group of judges is referred to as the *Judicial* Branch.

As was the result in Ancient Greece, these judges have become the arbiters of almost absolute power. They are not limited to the precise wording of a law, but only to their interpretation. They, alone of the three branches of government, cannot be overruled by either of the other two branches.

Roman laws were based on these Greek principles. Through the domination of the western world by the Roman military, these laws were put in place universally over the occupied area. These laws led to the era of "Pax Romana", or Roman Peace that dominated the world 2000 years ago. These laws were enforced through the might of the Roman legions, rather than through the voluntary cooperation of the people.

Like the Greek system, Roman laws made a clear distinction between "Citizens of Rome", and the rest of the world. This concept also prevailed through the English system of laws. The US constitution changed this in 1776, although in practice this situation existed until the middle of the nineteenth century.

After the fall of the Roman Empire, Europe and western civilization reverted to a period of almost lawlessness. European and English laws at the time were based on local customs, and were enforced through the military might of the local leader. In this leader were vested all the powers to create laws, enforce them, and interpret them. The only limit to this local control was a titular responsibility to the King. The King, however, answered to no one.

In England, this situation existed until the Norman Conquest in 1066. The Normans established local councils to attempt an enforcement of a uniform set of laws, established by the King. This led to the king's courts, some of whose decisions can be traced directly to justification for current legal decisions.

Under pressure in 1215, King John granted the Magna Charta to some of his barons. This document established a significant constitutional principle that harkens back to the ancient system of government, that is, the power of the king could be limited by a written grant.

Even before the Greek system, the law of the Medes and Persians stated that once a law was established, even the king had to live under this new law. This is the foundational principle for the US system of government and laws: no one is immune from the law, and the law treats everyone the same.

Equity and law

Judicial matters are divided into two segments, equity and law. The latter were established matters before the King. They were the rules that everyone in society had to live under. These dealt, primarily with what is referred to today as criminal law. The bases for these were the Decalogue or Ten Commandments recorded by Moses in the *Torah*. [Moses]

- No other gods (government cannot control religion)
- No graven image (government cannot establish a religion)
- Not take God's name in vain (public decency)
- Keep Sabbath day separate (certain business activity is limited)
- Honor your father and mother (protect elderly)
- You shall not murder (protect life)
- You shall not commit adultery (protect marriage & family)
- You shall not steal (protect property)
- You shall not bear false witness (perjury)
- You shall not covet others property (conspiracy)

There are similar concepts and statements in the traditions and religions of virtually all cultures of the world, including Moslem, Buddhist, Hindu, Jain, and others.

In contrast to those situations addressed in the formal laws, certain issues have to do with equitable treatment and fairness. Equity is

justice applied in circumstances not specifically covered by law, or where the law is influenced by principles of ethics and fairness.

These standards were not written rules, so the King would not rule on them. Instead, the King referred them to his spiritual advisor, the Chancellor. In time a court of Chancery was established, which led to the modern civil courts. In contrast to the King's Courts, Equity Court was faster, and decisions were arrived at without a jury.

As there were no formal laws that established the rules in these situations, early English judges based their opinions on previous similar cases. This set of decisions formed the English Common Law. Much of the US jurisprudence system is based on the results of the Common Law. This is particularly true in the civil courts. Many of the decisions in civil court are still based on "precedence" rather than on codified laws

In contrast, statutes passed by the legislative branch embody the legal code. These are the areas dealt with by the King's Courts under the English system, or the Greek Thesmothetae. Historically the legal code principally dealt with criminal laws, rather than civil disputes.

In some jurisdictions in the US, however, this is changing. There is a movement referred to as "Tort Reform" that would incorporate certain areas of the Common Law into the legal code.

Under the current US system, there are then two areas of law: civil and criminal. Civil law deals with those issues that can be resolved by monetary compensation. Criminal law deals with crimes against an individual's or society's, well being.

Although money may be at stake in criminal law, there is a larger good that is the driving issue. Often these are completely separate systems, with separate courts, judges and procedures; although in many jurisdictions, the same court and judges hear both types of cases.

Most issues of business and technical nature deal with civil matters, and the liabilities incurred under the Tort, or common law system. The rare cases of criminal action likely include fraud, perjury, or willful negligence.

US government system

Since there are many cultural and international issues associated with organizations, it is prudent to put the framework of the US government system into context. This will clarify many actions that may be involved in transactions between individuals and organizations around the planet.

The United States was formerly an English colony, like much of the world. As a result, the legal system is primarily derived from that English structure. However, because of other colonial powers, there is some influence of Spanish, in areas of the Southwest, and French, particularly in areas associated with the Louisiana purchase.

The English system is a parliamentary democracy. There is a titular ruler in the royalty. The legislative branch has two houses. The upper house is the House of Lords. These are representatives that are elected because of nobility, similar to the original Athenian system. Their objective is fundamentally to keep the lower house in check.

The lower house is the House of Commons. These representatives are democratically elected. As a result there are many factions. The House of Commons not only passes laws, but they also decide the government operation. They elect a Prime Minister who directs the executive branch.

Since there are many different splinter groups, the prime minister, and as a result the government, is typically formed by a coalition of factions with disparate interests. At any time, the prime minister's government can be recalled with a vote of no confidence. This gives minority parties inordinate influence in proportion to their size. As a result the government is somewhat unstable.

Much of the rest of the world's democracies are modeled after the English parliamentary system. This leads to strong minority influence. Without a strong two-party influence, the systems are more unstable. As a result, long term planning and objectives cannot be achieved. In several Mediterranean and Latin parliamentary systems, it is exceedingly rare for a government to survive the entire period between scheduled elections.

Although the US system was derived from the English, it has some very substantial differences. The United States government is unique in the world. It is a republic with representative government rather than a democracy. There is no royalty, nobility or right of succession. There are three independent branches of government - legislative, executive, and judicial.

The *legislative* branch has two houses, which make the laws. The "upper" house is the Senate. Two Senators are elected at large by each state. They serve for terms of six years between elections. As a result, their interests are often broader issues that affect large constituencies of entire states or regions.

The "lower" house is the House of Representatives. These legislators are elected from local areas, and can vary from 1 to 53 per state, based on population. Their term of service between elections is two years. The House of Representatives, then, tends to be more reactionary than the Senate, and can more directly represent the interests of a smaller number of constituents.

The US system is a representative republic rather than a democracy, which simply means the sovereign power, resides in the whole body of the people, and is exercised by representatives elected by them. The officials are not required to vote the way the electors' desire, but the way that is best, in their opinion. The Representatives have a set term. There is no provision for called elections as there is in a parliamentary system.

The *executive* branch enforces the laws. The chief executive is the President. The President is elected by a process that actually

represents the states, rather than a democratic vote. He is independent of both Houses. He has a four-year term and is not subject to votes of no confidence. In the rare instance of severe misconduct on the part of the president he can be impeached and possibly removed from office. In this case, the Vice-President would assume the duties of the President.

The US governmental process has led to the development of only two major parties. As a result, minority parties have virtually no power. Although it can be argued that this is not as "democratic" as a parliament, the two-party system has led to a very stable government that can ride out major difficulties. When the government does change, it is without significant conflict or military or police intervention. The system of government is perceived as more important than any individual party or person.

The system of representative republic established by the United States constitution is currently the oldest continuous system of government in the world. No other country has had a stable governmental system for the 225+ years that the US system has enjoyed.

That issue, in addition to its foundation in a strong moral code, is a major contributor to the development of the United States as the major industrial, economic, philosophical, intellectual, and military influence in the world.

The third branch of government is the *judicial*, which interprets the laws. Some judges are elected in a non-partisan, or no political party, process. Others are appointed by the executive and approved by the legislative branch. In many cases, the appointment is for life. This was intended by the framers of the constitution to keep the judiciary independent of other branches.

Traditionally, the judiciary operated with a strict interpretation, which means they interpreted the laws precisely as written. In recent history, much of the judiciary has become proactive in actually creating law. This comes about by extending interpretation to fit with their political agenda rather than to fit with the original intent

of the laws. As it was in the Greek system, this is not the purpose of the judiciary, although it has become reality in many jurisdictions.

Federal court system

Laws are administered in many ways. General adherence by the public is the most common. The court system consists of tribunals established by governments, and overseen by judges, to administer justice. Administrative agencies have power to invoke and enforce laws associated within their specialty. Alternate means of dispute resolution include arbitration and mediation.

The Federal Courts and judicial system are broadly established by the Constitution.

> The judicial power of the United States shall be vested in one Supreme Court, and in such inferior courts as the Congress may from time to time ordain and establish.
> - US Constitution, Article III

The *Supreme Court* is the ultimate appellate court in the land. Cases involving ambassadors, public ministers and counsels, and those in which a state is a party may originate there. Appeals may be made to the Supreme Court from the highest state courts, the US Courts of Appeals, or the US district courts.

There are thirteen *US Courts of Appeals*. They do not decide fact. They review final decisions of district courts and administrative agencies.

Each court is responsible for a specific geographical area, or circuit. The US Court of Appeals for the Federal Circuit was established to review cases in the District of Columbia. It is unique in that it is the primary court for deciding the facts of cases that are initiated by the executive branch.

The *District Courts* are the trial courts of the federal system. They may hear issues that deal with the Constitution or federal statutes. They also hear cases between citizens of different states. Most

issues that are brought in federal court could be tried in state courts, if the complainants resided in the same state. There are only a few issues that are unique to the federal bench. These are generally bankruptcy, patent, copyright, admiralty, and actions involving the United States.

Numerous special administrative courts address topics from taxes, bankruptcy, patents, and military appeals.

State court system

Each of the states has its court system. These have a variety of names and functions. Nevertheless, they can be categorized into three levels.

Minor judiciary have limited jurisdiction. These include small claims, justices of the peace, police courts, and juvenile courts.

Trial courts of general and original jurisdiction are the predominate influence. Often these are for criminal cases and only hear civil cases if the amount in contention exceeds a certain dollar figure. These may be called circuit court, superior court, or court of common pleas.

Appeals courts hear no new testimony. They rule on the trial procedure of other courts. The most common name for the highest court in a state is State Supreme Court.

Review

Society requires standards of conduct for acceptance within the group. The process of developing, enforcing, and interpreting the laws is called government. The Ten Commandments are absolutes that are the traditional foundation of United States laws.

Application

1. What is the simple, absolute standard that is the fundamental basis of law?
2. Compare the major benefit and weakness of a parliamentary democracy compared to a representative republic.
3. Is the United States a republic or democracy?
4. What is the difference?
5. What are the three branches of government?
6. What are the three major levels Federal courts?

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4

LITIGATION

Thought
The Ten Commandments are absolutes
that are the traditional foundation
of United States laws.

Disagreement

How are disagreements resolved in society? What are the terms used in legal disputes? Is it necessary to go before a jury to settle issues?

In other areas of relationships, we have discussed positive methods of interaction. This has involved understanding, communication, presentation, and negotiation. By definition, the legal process is adversarial.

Before litigation

In today's litigious environment, it is likely that a professional or organization will become involved or have an interest in a lawsuit at some time. Therefore, it is advantageous to look at the process of a civil trial.

If the parties are interested in resolving the issue, rather than "winning" over the other side, they will go to *mediation*, which is simply a talking through the disagreement before a disinterested

third party. [AAA] The results of mediation are not binding. If one party does not like the results, they simply disregard the process.

Binding *arbitration* is the next level. The parties may be separated in different rooms, with the arbitrators attempting to reach an agreement. Alternatively, the case may be tried in front of a panel of arbitrators, as in a court. This is an effective and relatively inexpensive process. The results of arbitration, and the decisions of the arbitrators are binding upon the parties involved. Often binding arbitration is specified in a contract as the only recourse for damages incurred as a result of the contract.

If binding arbitration is not specified, and one or both of the parties refuse to agree to the results of mediation, the only recourse is the court system. This will require the advice and counsel of an attorney. It is more important that the attorney be experienced in the class of action than any other issue. It is not the size of the law firm, but the finesse of the attorney that is critical. Can you relate to him and trust him with your future?

Litigation is expensive. A reasonable expectation of the outcome and expenses should be the first part of the discussion. Remember that, in most cases, the attorney gets paid whether you win, lose, or draw. The exceptions are cases where the attorney agrees to try the case on contingency: that is he gets paid only a percentage of the recovery, rather than on an hourly basis.

Like all businesses, the attorney's interest is developing time and clients. Be aware of that issue. We have had much better success with attorneys that want to develop a long relationship with a client, than with those who are professional hired guns that want to litigate. Go for the big guns in the criminal cases. Depend on a trusted long-term relationship for the civil issues.

Litigation

A *plaintiff* brings the complaint by filing a suit in court. The *defendant* is the party being sued. The defendant may file a

counterclaim against the plaintiff, or may file a claim against third parties as co-defendants. By definition, this is an adversarial process.

The complaint names the defendants, the cause of action, defines the damages to the plaintiffs, and requests relief. A *summons* is issued to the defendant to respond to the court within a stated time.

The defendant may respond in several ways.

1. No answer results in a default judgment in favor of the plaintiff.

2. Agreement by the defendant as to aspects of the plaintiff's case, which often results in a settlement.

3. Filing a demurrer, or a written response to a complaint, which in effect, pleads for dismissal. The point argues even if the facts alleged in the complaint were true, there is no legal basis for a lawsuit. The judge will decide on the merits of the demurrer, and either dismiss the case or allow it to go forward.

4. Denial of the allegations results in the process going forward, and presentation of a defense by the defendant.

A standard defense attacks the Plaintiff's testimony, attempting to convince the judge or jury that the facts do not support the Plaintiff's allegations of wrongdoing.

An affirmative defense advises the court that there is new information that would bar the plaintiff's recovery. It is based on the premise that, even if the Plaintiff's information is taken at face value, there is some other part of the law that makes the defendant not liable for the damages.

If the facts are not in question, one side may request a *summary judgment*. After a hearing, the presiding judge may render the opinion and no trial is necessary. The result is an award to the defendant or plaintiff.

If the case proceeds, each side will want to find what the other knows. The process is called *discovery*. The intention is to get information from the other side without giving away the strategies of your side. There are several vehicles used in the process.

1. Interrogatories are written questions addressed by one party to the other.

2. Requests are made to produce documents and other physical evidence.

3. Requests for admissions are written questions asking one side to admit to the genuineness or validity of documents or facts. The form is typically very simple, e.g. “Do you admit that you were employed by ACE on the XYZ project?” (The answer is no if you were a contractor.)

4. Physical and mental examination of persons or examination of items involved in the controversy is conducted by experts such as physicians or engineers.

5. Depositions are sworn testimony of fact witnesses or experts. The opposing lawyer typically takes the deposition in the office of the lawyer with whom the witness is working. If you are an expert, this will be a lengthy process of questions about credentials, what you know, and what you expect to testify to in court. I have had depositions shorter than one hour and one that was three days.

The judge will schedule one or more *pretrial conferences*. This allows the attorneys to determine the status of discovery, simplify issues, establish procedures and schedules, and to attempt to reach settlement.

Avoid going to court and jury if possible. No one knows the outcome. It is simply a throw of the dice. The jury can only find one of three ways and two of them are bad. They can go against you, call a draw, or go with you. Even going with you, the award may

not be what you desire. Stay away from the courthouse, except as a last resort.

Trial

For some civil trials, no jury is allowed and the judge decides the case. In others, either side can request a jury trial. Some attorneys prefer one method or the other.

If a jury trial is requested, the first order of business is selection of a jury. Certain potential jurors may be rejected based on the rules of the court.

The counsel for each side makes opening statements. Next is the process of presenting evidence.

The plaintiff's attorney begins the process by introducing witnesses and testimony. This is called direct examination. The defendant's attorney questions the witness during cross-examination. In the next round of questions, the plaintiff's attorney tries to clarify with re-direct examination. The last round is re-cross examination by the defendant. After the plaintiff has presented all his witnesses, the plaintiff rests.

The defendant's attorney may then ask for *dismissal* or *nonsuit*, which claims the plaintiff has not proved their case. If the judge rejects the motion, then the defendant's witnesses are presented in the same manner as the plaintiff.

After all the evidence has been concluded, either side may ask for a directed verdict in its favor as indicated by the evidence or law. If the judge grants the motion, he is removing the case from the jury and deciding the outcome.

If there is no directed verdict, the attorneys make closing arguments as a summary of their position on the case. The jury then is removed to their chambers to decide the case and reach a verdict. Federal, and many state, jurisdictions require a unanimous decision. Some

states only require a minimum of three quarters of the jurors. If the decision is for the plaintiff, the jury usually must also decide the amount of the award called the judgment.

The process is not over yet. The losing side may file a motion of *judgment non obstante verdicto*. This translates to "judgment notwithstanding the verdict", which argues the jury decision is not supportable. After the judgment is accepted, either side may file for a *mistrial*, or new trial, based on one of four points.

1. The judge committed prejudicial error.
2. The damages are too much or too little.
3. The other side committed prejudicial misconduct during the trial.
4. New evidence was discovered during the trial.

The trial judge must decide on all these motions. If all the motions are rejected, the judge enters a final judgment.

At that point, the trial judge has completed his duties, but the process is still not over. Either party may appeal to a higher court. This court does not investigate the facts. Its responsibility is to decide if there was error of law. The attorneys file written briefs and perhaps oral arguments. If there was no error in law, the trial court decision stands. If error is found, the original judgment may be reversed or modified. If there is insufficient evidence to justify a decision one way or another, the case may be remanded or sent back to the trial court for a new trial.

It is obvious that this is a very extensive process that requires substantial time and consequently substantial money. With the results in someone else's hand, it is a risky process. For that reason, most cases are settled before entering the court. Even if the settlement is not what is desired, it is prudent. Unless there is a total obstinacy on one party's part, settlement is the right decision.

Evidence

Evidence are the documentary or oral statements and the material objects admissible as testimony in a court of law. It comes in many forms.

Real evidence is a physical thing such a burned wire or written document. *Testimony* is statements by witnesses. *Hearsay* is second hand information that generally is not allowed in court. Hearsay is usually allowed in a grand jury, preliminary hearings, and similar investigations leading to the court. *Parol evidence* is oral testimony that attempts to modify a written document. It is generally not allowed.

An ordinary witness is permitted to offer personal observations or opinions that would be expected from a "reasonable" person. An expert witness is a specialist in his field. A note about expert witnesses is in order, since professionals may be in this position. J. T. Bocrath in *Dunham and Young's Contracts, Specifications and Law for Engineers* gives a good differentiation.[Bocrath]

> "The real distinction between the expert witness and the nonexpert is that the former gives the results of a process of reasoning which can be mastered only by those of special skills, while the nonexpert testifies about subject matter readily comprehended by the ordinary person and it gives the result of a reasoning process familiar to everyday life."
> - J.T Bocrath

Legal liability

As was mentioned before, most cases that a professional or executive will encounter are civil in nature. These primarily deal with liability for actions or *Torts.* The most common liabilities that will be encountered are listed below.

The most common area of liability for an organization involves not following Federal or State regulations. Several areas of regulation such as OSHA, the Americans with Disabilities Act, EPA, EEOC,

Worker's Compensation, and the like are quite complicated. As a result, they are difficult to understand and follow.

Fines for not following these stringent regulations can become quite onerous. Additionally, in many cases, the results of investigations by federal or state agencies are available to the general public, and can be used by other plaintiffs in separate lawsuits.

The second area of liability commonly encountered in commerce is negligence. Negligence is defined as failure to exercise the care that a reasonable prudent person would do, or to not take action that a reasonable or prudent person would take. Negligence is, by definition, accidental. To prove negligence, the plaintiff must prove four issues.

1. *Duty* – The defendant had a particular duty to the plaintiff as the result of some specific relationship, or that the defendant had a duty to the general public.

2. *Breach of Duty* – The defendant did not perform the duty that he owed toward the plaintiff, as a reasonable, prudent person would.

3. *Proximate Cause* – The actions (or lack of actions) of a defendant are the closest or most direct reason for damage to the plaintiff.

4. *Damages* – The plaintiff incurred some damages, most often monetary loss, as a result of the defendant's breach of his duty.

It is critical to note that, in civil cases, the plaintiff does not have to prove these items "beyond a reasonable doubt", as the prosecution would in a criminal case. The plaintiff only has to prove that the defendant's actions were the "probable cause" of the plaintiff's damages. The term "in all probability" is often used to describe the position that the plaintiff's evidence will take.

In today's litigious society, the public perception is that, if there are damages, then there has been negligence. There are two legal terms

to describe this. The first is negligence *per se*. The second is referred to by the legal doctrine of *Is Ipsea Loquitor* , Latin for "the thing speaks for itself."

Technically, the above doctrines have no basis in fact. Damage is only one of the four pillars of negligence. Unfortunately, public perception has been shaped, in part, by reality. There has been an increasing trend among the courts to find the deep pockets, and to give lenience to the plaintiffs in a case, at the expense of innocent defendants. The argument is that there were damages, and the "wealthier" party is more able to bear the cost, and can spread the cost in increases in price, insurance and the like.

Consider the following.

An automobile hit a power line carrying medium or high voltage cable. The power line fell, and landed on the car. Because of the insulating properties of the car tires, the line was isolated from the ground, and the circuit breakers did not trip. As the driver stepped out of the car, however, the driver's body provided a direct path to ground, and he was electrocuted. The plaintiff argues negligence *per se* or *is ipsea loquitor*. Obviously the power line was the cause of the damage (death) to the driver, so the owner of the power line is responsible. The thing speaks for itself. A man is dead, and someone should pay. The defense counters that the owner of the line has no duty to protect poor drivers from leaving the roadway and striking the pole. In fact, the driver is responsible to the line owner for damages to the pole and the line. Thus, there is no duty, and without duty, there is no breach of duty.

How do you think the case should be decided? Would it matter if the driver of the car was driving well beyond the posted speed in hazardous road conditions? What if the driver were legally intoxicated, driving home from a New Years Eve party in a snowstorm? Does it matter that the pole had been struck on numerous occasions by other automobiles? What if this was the second person in three years who had been electrocuted in a similar way by striking power poles owned by the same company?

The point of the exercise is that there is no right or wrong answer, in the eyes of the courts. The facts of the above case have been tried in several different jurisdictions, under slightly different circumstances, and have been ruled both ways. It is important for the professional to be cognizant of the vagaries of the court system, and do everything he reasonably can to avoid damages. There is no precedent in the tort system that says an innocent defendant will not have to pay.

Negligence is the single most litigated area in the US system. It has been applied to cases ranging from professional malpractice, to product liability, to dog bites. There are several areas that are important for a professional or executive to be aware.

1. *Breach of Contract* – One party to a contract failed to perform the duties demanded of him by the contract.

2. *Interference with Advantageous Relationships* – Where one party damages the other party's relationship with vendors, subcontractors, or clients.

3. *Product Liability* – A company creates a product, and the product is defective either by design or by an error in the manufacturing process.

4. *Strict Liability* – Where an organization is held liable for actions they take, or products they manufacturer, even though the action is completely legal, or the product is not defective.

5. *Errors and Omissions* – This is unique to the professional, often to the technical professional. It defines the area of negligence where someone providing a service makes mistakes, "errors" or leaves things out, "omissions" and these cause damage to the client. It is easy to see how this could be applied to a design-engineering firm, or to a real estate agent in the preparation of a deed.

6. *Misrepresentation* – One party represents, or states, that he is qualified to perform a certain task, but does not have the

experience, training, or personnel available necessary for the proper completion of the task.

7. *Defamation* – One party makes false, or defamatory, statements about the other party, and the result of those false statements cause damage to the defamed party. In the age of instant, and often thoughtless, communication via email, this is becoming a greater and greater risk for organizations.

8. *Other areas* such as invasion of privacy, wrongful death, intentional interference with persons or property, or nuisance may also be applicable to particular transactions. It is critical to exercise extreme caution, and proceed with legal council, when the propriety of any action is in question.

Review

The court system is society's method to argue one's position in a structured forum. If at all possible, avoid the court process since it is costly and out of control of the participants.

Application

1. Describe the major differences in mediation and arbitration.
2. What is a plaintiff and a defendant?
3. What is the major factor that defines an expert?

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5

CONTRACTS

Thought
If it is not in writing,
a disingenuous party will change the deal,.
and you will lose.

Agreement _____

What is a contract? Does a contract have to be written? Can it be modified? What are the elements of a contract? What are thy types of contracts used to compensate the contractor?

A contract is an agreement between parties that is enforceable by law.

Commercial contracts are a common part of doing business. For items as mundane as telephone service or parking a car in a lot, a contract is entered into. These are standard arrangements that are offered by the firm providing the service. The purchaser has little if any input into the terms of the contract. It is take-it or leave-it, if you want the service.

Construction, engineering, and architectural services contracts are set apart by two attributes. First, the clients are often relatively inexperienced in contractual or technical details. Second, the initial phase in contract formation is rather vague and informal. Other than these two attributes, all contracts fit a standard form.

Elements

Each contract has five elements. These will be discussed in detail.

1. Both parties are competent
2. Subject matter is definite.
3. There is a meeting of the minds.
4. Consideration is exchanged.
5. The form is legal.

Both parties are competent simply means they are capable of carrying out their respective obligations. The contractor must have the ability and authority while the client must have the financial wherewithal and control of any property.

The *subject matter must be definite* so that both parties know what is to be done in sufficient detail that the product can be produced. In addition, a contract cannot be made or enforced for illegal activity. Since the topic does not start off defined, there is often a planning phase where the contractor assists the client in developing a plan of action. Once the client decides to continue, the design phase is entered. This is the work that the public considers as the project.

Meeting of the minds implies there is an agreement. This is often referred to as "arm's length" negotiations. There must be an offer by one of the parties and acceptance by the other. The point of acceptance is sometimes difficult. There must be an exact acceptance. Any change represents a new offer. While contracts are typically written, the acceptance can usually be verbal.

Consideration means something of value must be promised or done on each side. The true value of the consideration need not be specified. A nominal phrase is often "ten dollars and other good and valuable consideration." This is unnecessary. The courts assume that both parties have taken care of themselves.

The *form* is specified for certain types of contracts. Real estate transactions absolutely must be written. Most other forms of contract must be written. One exception is construction contracts. If the construction is completed in a relatively short time, such as one year, a written contract is not legally required. If one is exercised, it should be taken seriously since these are notoriously questionable.

Standard contract items

Despite the type of contract, there are certain items that must be covered. For a professional services contract, each item can be covered by a single sentence statement in the contract or rate sheet. For a complex design build project, some sections may require several paragraphs.

The following paragraphs are taken from a professional services contract that has been developed and used for over 25 years in one of our consulting companies. They cover the basics of areas that should be included into an agreement.

Any disputes are subject to binding arbitration. This agreement is executed in Tulsa, OK, the proper choice of venue is Tulsa in the State of Oklahoma, and the agreement is governed by the laws of the State of Oklahoma. The corporation and the professionals' liability for damages will be limited to the fee or appropriate portion. The corporation will protect and hold client's information in reasonable confidentiality. There are no other warranties and this agreement supersedes all other communications.

All prices are USA currency net after any international taxes, allowances, and deductions. Rates are subject to quarterly review. Customers billed under these rates will be notified of any changes.

Professional compensation _____

Compensation for professional services is somewhat different than paying for a commodity or an item that is well defined. The variations in compensation are fundamentally differences in

transferring the risk for the work between the contractor and the client.

Fixed fee compensation can be used if the work is well defined. The contractor agrees to work for a lump sum amount. This reduces the risk for the client. The sum covers all costs and profit. The payments may be in single amount or distributed over time. One frequent distribution is 30% at time of purchase, 30% at some defined point such as a delivery, 30% when the job is complete. The final 10% is paid after 30 days if all conflicts are resolved.

Percentage of construction cost is used on larger projects where there are expected changes and development as the job progresses. This shares the risk between the professional and the owner. Typically the fee for engineers is 5 – 10% of the cost. One must be careful to define what the costs include. Is it total cost, direct material and labor costs, or some other factor?

Multiple of direct hourly expense is the simplest method with least risk for the contractor but most for the client. It is simple to implement. The professional typically has a published rate per hour. The contract is simply an acceptance of the rate schedule. That is multiplied by the hours worked. Occasionally, there will be a “not to exceed” amount.

Expenses plus professional fee is used by some creative specialists. The project task is for a fixed amount. If it is not well defined the professional may provide specified services or supplies at a percentage of the cost.

In addition to how and when the fees are paid, the contract should address how disagreements will be resolved. It should also cover items such as limits on liabilities.

Contractor compensation

Contractors and professionals obviously have much in common.

Fixed price is equivalent to the fixed fee. For a defined task that is performed by the contractor, the client will pay a fixed price.

Unit price is equivalent to multiple of direct hourly expense. The price for each unit of work is defined. The cost is the multiple of units and unit price. This is often associated with feet of utility line, square feet of area, or cubic feet of volume.

Cost plus fixed fee is also similar to expenses plus professional fee. This method is frequently used by a building contractor. He receives a fixed amount for the job plus all the costs associated with completing the project.

One thing should be observed about these compensations methods: they all actually transfer more risk to the contractor and less to the client. That is particularly interesting since the contractor generally makes the contract. Even with this situation, the profession tends to be maligned.

Contractor relationships

The previous sections addressed the fees paid to professionals and contractors. This section describes the contract relationships. The five types describe how the client is involved in defining when the contract is completed.

Design/build describes a relationship in which the contractor is responsible for the design and arranges for the construction. After the planning phase, a preliminary cost is estimated. The contract is often a cost plus fixed fee. There is typically a not to exceed value. The biggest challenge is defining the scope of the project.

Turnkey is sometime used synonymously with design/build. In theory the client turns over the complete project to the contractor. At the completion, the contractor turns the key over to the owner. This is actually an expansion of the design / build contract in that the contractor may even purchase the property. Typically a fixed price is agreed early in the process.

Construction manager is often an agent for the owner. The owner will maintain control of contracts and contractors. The Manager is an independent consultant that is the owner's adviser. A variation is the project manager. He has responsibility for design and advises the owner about construction. The advantage is the project can be begun before design is complete.

Fast track is really only a process where construction begins prior to the completion of design [Tarricone]. Construction begins before the design is complete. The challenge is for the designer to stay ahead of the construction. The objective is shortening the time of the project. The actual contract may be any of those previously discussed.

End-result focuses on the end result rather than the methods and processes to achieve the completion. These often contain incentives for completion of project milestones.

An excellent example of project management, motivation and rewards, and end result is demonstrated in a single major project. The interstate highway I-40 bridge over the Arkansas River near Webbers Falls, Oklahoma, was struck and destroyed by a barge in 2002. Fourteen people were killed. Because of the high profile and traffic needs of a major east/west continental highway, a fast track contracting process was used. The design firm had a 16 day contract with a reward of $5000 for each day early and $2400 penalty for each late day. The design was ready for bids in 12 days.

The contractor bid on both the project and the time expected to complete the project. The reward was $6,000 for every hour less and a penalty of $6,000 for every hour over the bid. The contract was let for 56 days. Gilbert Central Corporation beat the contract by 10 days and received a bonus of $1.5 million dollars. That was a bargain, since the Oklahoma Department of Transportation estimated the cost was $430,000 for every day that the bridge was out of service. Total time from the day of bridge collapse until the bridge was reopened was 64 days. [Oklahoma] Incentives work.

Review

A contract is an agreement between parties that is enforceable by law. There are five elements to a valid contract. Compensation for services provided is a key element to the contract. Compensation is based on fees, determined price, or price for performance. The contract is typically developed by the contractor, but interestingly, transfers the risk to the contractor until well after completion. Rewards and incentives tend to provide better performance than penalties.

Application

1. Prepare a very simple contract between you and a friend for you to provide a service which you expect to take 3 hours to perform.
2. Include the 5 elements.
3. Describe work to be performed.
4. Describe compensation.
5. Describe the relationship.

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6

EMPLOYMENT LAW

Thought
Society has imposed employee activism
above traditional rights of property and ownership.

What is the basis _____

What is employment law? How does it differ from contract law? Is employment law a state or federal case? What is "at will" employment? What is the public policy about employment?

Law is dynamic. Changes may modify or negate this interpretation of the current laws. This is a discussion and synopsis. It is not a legal opinion. Refer to an attorney qualified in the area, for questions and legal interpretation.

Employment law is a relatively new addition to the legal system. Its purported purpose is to protect someone who works for another. As its premise, it has the pretext of "to be fair". However, it has developed into an advocacy role for the employee at the expense of the rights of the owner. Two counterpoints are illustrated.

> Common sense is not common, so the law arises to enforce it.
> -Attorney David Davis

> Society has imposed employee activism above traditional rights of property and ownership.
> -Unknown

Employment “at will” is based in English common law. “At-will” employment is voluntary and indefinite or on-going. Either the employee or the employer may terminate the job at any time and for whatever reason, usually without consequence. [Niznik]

In some cases, the relationship may be modified by a union agreement, an employment contract, or a company policy manual that you agree to uphold. An employee “at will” can be fired for almost any reason except these three: contract, discrimination, or public policy.

In the 1980’s numerous legal actions began to penetrate the veil of “at-will” contract. In most jurisdictions, an employer must show “just cause” to terminate an employee. This may include wrongdoing by the employee or economic necessity by the employer.

> At-will employment has been replaced by laws which prohibit discrimination whether real or perceived.

The following information is extracted from a lecture by David Davis, Attorney-at-Law [Davis] to an Engineering Management class at the University of Tulsa. Since it is a summary, it is not a complete brief and does not necessarily reflect his opinions. Other sections are from handbooks. [Lee] [Lindemann]

Major federal laws

The major “Equal Employment Opportunity” laws impacting employment, which will be discussed, are listed. Each of these represents an exception to the “at-will” doctrine of employment.

1. Title VII of the Civil Rights Act of 1964, as amended (Title VII)
2. Age Discrimination in Employment Act (ADEA)
3. Americans with Disabilities Act (ADA)
4. Family and Medical Leave Act (FMLA)

5. Fair Labor Standards Act (FLSA)
6. Equal Pay Act (EPA)
7. Occupational Health and Safety Act (OSHA)
8. State Laws
   A. Handicap Discrimination (HAD)
   B. Public Policy Tort

There is prima facie evidence for a legal case if the employee meets all four of the criteria.

1. She is in a protected class.
2. She is qualified for the job.
3. She has equal or greater qualification than others.
4. She is not hired.

Title VII _____

Purpose
Title VII protects employees who are discriminated against based upon their race, color, gender, national origin, or religion. The law was expanded by the Pregnancy Discrimination Act to include pregnancy.

It protects employees who are retaliated against due to their opposition to practices made unlawful by Title VII. An example is being retaliated against for filing a charge of discrimination with the Equal Employment Opportunity Commission.

Who Is Covered?
The law applies to employers with 15 or more employees in 20 or more work weeks in this or the preceding calendar year.

Comment
The law has become pervasive to the point that virtually any action by an employer is subject to scrutiny and litigation.

ADEA

Purpose
The Age Discrimination in Employment Act protects employees, age 40 and above, who are discriminated against based upon their age.

It protects employees who are retaliated against due to their actions which are protected by the Act. An example is filing a charge of discrimination or assisting another person with a charge of discrimination.

Who Is Covered?
The act applies to employers with 20 or more employees in 20 or more work weeks in this or the preceding calendar year.

ADA

Purpose
The Americans with Disabilities Act protects qualified employees with a disability from discrimination based upon that disability, be it physical or mental.

It protects employees who have a record of disability from discrimination based upon that record.

It protects employees who are regarded as having a disability from discrimination based upon that perception, even if no disability truly exists or ever existed.

The Act protects employees who are caregivers for someone with a disability.

It requires employers to make reasonable accommodations to qualified individuals with a disability.

Who Is Covered?

The Act applies to employers with 15 or more employees in 20 or more work weeks in this or the preceding calendar year.

FMLA

Purpose
The Family and Medical Leave Act provides eligible employees up to 12 weeks of unpaid leave for any of the following circumstances:
1. Birth , adoption, or placement of a child;
2. Serious health condition of the employee;
3. To care for a family member with a serious health condition.

The Act provides those employees who have taken FMLA leave the opportunity to return to the same, or substantially equivalent position, upon return from the leave.

Who Is Covered?
The Act applies to employers who employ 50 or more persons.

To be eligible an employee must meet all three criteria.
1. He must have worked 1,250 hours for the employer during the last 12 months,
2. He must have worked at least twelve months for the employer, although it need not be consecutively, and
3. He must be employed at a worksite which employs at least 50 employees within a 75-mile radius.

FLSA

Purpose
The Fair Labor Standards Act sets minimum wage, overtime pay, equal pay, record keeping, and child labor standards for workers who are covered by, and not exempt from, the Act.

Who Is Covered, Employers?
If an employer constitutes an enterprise as defined by the act, all employees of the enterprise are covered regardless of whether the

individual employee is actual engaged in interstate commerce. It is prudent to assume you are covered unless you have a formal legal opinion that states you are not.

Who Is Covered, Employees?
There is a distinction between employees not covered by the Act and employees exempt from certain provisions of the act. Certain individual workers are outside the reach of the act. Examples include bona fide independent contractors, certain homeworkers and cooperative ventures, trainees, prisoners, bona fide volunteers, elected officials and their personal staffs, political appointees, legislative employees, and certain workers for foreign governments.

The definition of an independent contractor is established by the economic reality test. *Doty v. Elias d/b/a Eddy's Steakhouse, 733 F.2d 720 (10111 Cir. 1984)*. The courts set forth the five factors to be analyzed:
1. the degree of control exerted by the alleged employer over the worker,
2. the worker's opportunity for profit and loss,
3. the worker's investment in the business
4. the permanence of the working relationship, and
5. the degree of skill required to perform the work.

EPA

Purpose
The Equal Pay Act of 1963 was an amendment of the FLSA. The Act requires equal pay for equal work regardless of the gender of the employee. It prohibits an employer from discriminating between employees on the basis of sex by paying employees of one sex less than employees of the opposite sex for work performed.

For jobs which are substantially equal, a wage differential is permissible between men and women under the EPA if one of the four justifications exists:
1. a bona fide seniority system,
2. a merit system,

3. a system which measures earnings in terms of quantity or quality of production, or
4. any other factor other than sex.

Who Is Covered?
The EPA applies to all employees of an employer covered by the FLSA, whether exempt or non-exempt.

At will exceptions, one state _____

Federal laws do not preempt state laws. Both laws apply. If there is a conflict, the law providing the most protection to the employee is to be followed.

Under the "at-will" doctrine, the employment relationship may be terminated at any time for any reason by either the employee or the employer. When an employee does not have a written contract and there is not a definite term of employment, the employer may terminate the employment relationship for good cause, bad cause, or no cause at all, *Singh v. Cities Service Oil Co., 554 P.2d 1367* (Okla., 1976).

The "at-will" doctrine has slowly eroded since the industrial revolution. The legislatures and courts in their wisdom began to recognize that employers and employees typically do not have equal bargaining power. Accordingly, the legal system began to carve out exceptions to the "at-will" doctrine and provide employees with certain areas of protection where it is believed a public interest would benefit if the employees had some protections.

The specific examples below apply to Oklahoma law. Because of the state's foundations in the progressive movement of the early 1900's, these laws in many instances are more aggressive than other states. Nevertheless, they provide an excellent foundations for the exceptions to "at will" employment.

Exceptions to "at will" have been created in some cases by the state legislature. Courts have been much more active. The court

exceptions cases fit into three categories – public policy, implied contracts, and covenant of good faith and fair dealing. Each of these will be considered.

The list of exceptions based on statues is actually quite limited and rational. A person cannot be terminated for any of the following reasons.

1. The employee filed a workers compensation claim. *Oklahoma Statute Tit. 85 §§5-7.*
2. The employee smokes or uses tobacco products during non-working hours.
3. The employee misses work as a result of jury duty.
4. A creditor garnishes or attempts to garnish the employee's wages.
5. A wage and income assignment has attached to the employee's wages though a divorce decree.
6. The employee misses work due to serving on a grand jury.
7. The employee is called to active military duty.
8. Discrimination is prohibited against a person with handicaps in terms and conditions of employment. *Oklahoma Statute Tit. 25 §1901*.

Judicial public policy exception _____

The Oklahoma Supreme Court held in a case, *Burk v. K-Mark Corp., 770 P.2d 24* (Okla. 1989), that a claim for wrongful discharge exists when "an employee is discharged for refusing to act in violation of an established and well defined public policy or for performing an act consistent with a clear and compelling public policy." When the discharge is coupled with a showing of bad faith, malice or retaliation, the Burk Court outlined five actionable public policy grounds as

1. employee dismissal for refusing to participate in an illegal activity;
2. employee dismissed for performing an important public obligation;
3. employee dismiss for exercising a legal right or interest;

4. employee dismissed for exposing some wrongdoing by the employer; and
5. employee dismiss for performing an act that public policy would encourage or, for refusing to do something that public policy would condemn,

A case that further defines the Burk ruling is *Collier v. Insignia Financial Group, 981 P.2d 321* (Okla. 1999), where the Court held that employees could be "constructively discharged" even though they continued to be employed by the company. A constructive discharge as defined by Collier is i) whether the employer either knew or should have known of the "intolerable" work conditions and ii) if the permitted conditions were so intolerable that a reasonable person subjected to them would resign.

The constructive discharge test is fact specific considering items such as the frequency of discriminatory conduct directed at the employee, the severity of conduct, humiliation factor, verbal and physical offences and whether the conduct unreasonably interfered with the employees work performance.

The Burk and Collier rulings allowed the employee to assert state common law claims against the employer in addition to the federal and state statutory claims. This allowed the alleged aggrieved employees to bring multiple claims in one lawsuit against employers.

In a more recent ruling, *Clinton v. Logan County Election Board, 29 P.3d 543* (Okla. 2001), the brakes were put on employees bringing multiple claims in one suit against an employer. Clinton held that an employee cannot bring a "Public Policy" lawsuit against an employer if an adequate federal or state statutory remedy exists.

Judicial implied contract exception _

A judicial exception to employment at-will for implied contracts was created in the case of *Hinson v. Cameron, 742 P.2d 549* (Okla. 1987). The Hinson case involved a nurse who was terminated by her

employer hospital. The nurse asserted that she was wrongfully discharged because the hospital's Employee Manual created an implied contract.

The hospital had adopted and distributed an Employee Manual that set forth the hospital's policies, including a section that specifically listed the grounds for termination of employees. The nurse was not terminated for any of the grounds that the Employee Manual listed. The nurse stated that she had an implied contract due to the employee manual. The hospital asserted that no written contract existed and the nurse was terminable at-will.

The Hinson court held that the Employee Manual as adopted and distributed by the hospital created an implied contract between the hospital and its employees. Therefore the nurse had been wrongfully discharged because the hospital failed to discharge her for the reasons stated in the manual.

The Hinson court looked at factors such as, what were the terms and conditions in the Employee Manual, policy manual, the employee's reliance on oral assurances, company policies, employment interviews, and length of employment, past practices, promotions and commendations.

In a case, *Russell v. Board. of County Commissioners, 952 P.2d* (Okla. 1998), the court provided relief to employers stating that if an at-will employment relationship is clearly stated in the employers handbook and the handbook includes a disclaimer that clearly, unambiguously, and conspicuously states that the employee handbook is not a binding contract on the employer, it will not be the basis of an implied contract.

Judicial covenant of good faith _____

The Oklahoma courts have not adopted the theory of "good faith and fair dealing". In *Burk v. K-Mark Corp., 770 P.2d 24* (Okla. 1989), the court stated that they "reject the implication of an

obligation of good faith and fair dealing in every employment-at-will contract."

Despite the fact that the covenant of good faith and fair dealing is not recognized as legal theory in Oklahoma, employers should be cautious with employees. Employers should not act in highly offensive, outrageous conduct towards employees due to possible tort actions that may be asserted against them.

Review

Employment "at will" is based in English common law. "At-will" employment is voluntary and indefinite or on-going. Either the employee or the employer may terminate the job at any time and for whatever reason, usually without consequence. This traditional philosophy has been eroded by federal and state laws and the courts. The major laws are listed.

1. Title VII of the Civil Rights Act of 1964, as amended (Title VII)
2. Age Discrimination in Employment Act (ADEA)
3. Americans with Disabilities Act (ADA)
4. Family and Medical Leave Act (FMLA)
5. Fair Labor Standards Act (FLSA)
6. Equal Pay Act (EPA)
7. Occupational Health and Safety Act (OSHA)
8. State Laws
   C. Handicap Discrimination (HAD)
   D. Public Policy Tort

At-will employment has been largely replaced by laws which prohibit discrimination, whether real or perceived.

Application

1. Is at-will employment a reasonable process and why?

2. Explain why you think laws are necessary to modify consensual employment activity?
3. Which federal act provides protection from employment discrimination based on religion?
4. What is a contractor? Why would he be exempt from employee compensation?
5. What is the defined role of courts in the Constitution? Does this include making laws? Is it appropriate for courts to make laws?

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7

PROJECT MANAGEMENT

Thought
Project management requires skill with people, dollars, and technology
RAD

What skills _____

What is project management? Is it different from any other management? What skills are necessary to be successful? What are the trade-offs? Why separate projects from organizations?

Projects are unique in an organization. They exist for a set time and purpose. They have a definable cost, schedule, and task. A project manager must have the skills of any manager. Additionally, he must have a fair understanding of the technical issues.

There are two major qualifications of a project manager.

> Project management requires skill with people, dollars, and technology.
> - RAD

> Project management is the trade-off between time, money, and quality.
> - MOD

These are not conflicting, but rather complementary criteria. Collegiate education seldom addresses all of these skills coherently. Most formal education will address only one of the issues to the exclusion of others.

Engineers and other technologists have extensive experience with technology, but it is often very focused and narrow. Their education will create a talented individual in a specialty. This specialization is necessary for certain highly technical areas, but is inadequate for the broad spectrum of technology required to manage projects.

Business and financial types have extensive experience with money. It is often focused on financial institutions or balance sheets. This is inadequate for the management and allocation of resources to specific tasks and time.

Sales and management types may have extensive experience with people, but it is focused on a fixed environment and location. This is inadequate for people who are relocated frequently, operate on long schedules, and are away from family and direct oversight.

Time scheduling using critical path analysis is occasionally addressed in some technical and management courses. Time budgeting, control, and management are not part of the normal educational purview of any curriculum. These skills are born of necessity through experience. It is almost something that is learned by osmosis, or rather through observing other successful time managers.

Quality is a component of risk management. It is now being introduced into some collegiate curriculum. Risk management to a financial type is very different from performance control on a construction site. Risk management from a financial perspective deals with diversifying risk to *stabilize* the outcome. Performance control demands that all functions cooperate to *improve* the outcome.

It becomes very clear that project management is a skill set that is highly desirable for a successful leader in any organization. With

these foundations, a successful PM can move into any arena. Unfortunately, many individuals that are in project management positions are limited in their ability. They are often there because they are technically capable in some area, rather than having developed skills in all three areas required for success.

Because of the diversity of activity required in a project, the project manager should report to a very high level in the organization. In most organizations, this should be at least a vice-president. Managers and directors typically do not have the clout to provide, in a timely manner, the resources that a project manager must have available for success.

A successful project manager keeps his focus on the objective. It is about creating a successful project. It is not about bureaucracy building. An early boss, engineering manager, and mentor had a very succinct philosophy about the ineffectiveness of traditional management.

> You know, we had a fire. It destroyed every record and file that we had. Did you know that we did not lose one bit of production?
> - Foley Wright

Mr. Wright was not advocating ignoring documentation and monitoring. He was placing it in perspective.

Most Successful PM _____

The late Clarence L. “Kelly” Johnson was an aeronautical engineer for Lockheed. He was arguably the most successful project manager who ever assumed the role.

His approach is unpopular in some circles because he eschewed traditional corporate bureaucracy. He was anathema to organization builders, corporate politicians, and involvement in project management by support groups such as accounting. Johnson’s leadership style was more task-oriented than team driven.

Johnson's total focus on the project allowed him to achieve phenomenal results, with very few people, in record time, and within budget. Is that not the measure of a successful project manager?

In graduate school, I was fortunate to have Kelly as an instructor in a scholarship - leadership enrichment program. One of my valued possessions is an autographed photo of one of Kelly's designs, the SR71 Blackbird. This phenomenal aircraft was designed and built in the late 1960's. No aircraft that we are aware of has come close to its speed and altitude performance in over forty years.

Kelly Johnson developed fourteen project management principles. [Johnson] These were particularly addressed to civilian management of military projects. As success principles apply equally to any endeavor, these principles can be applied to the management of any project.

Fourteen principles

The principles are modified slightly where necessary to make it apply to a corporate project. Specifically, the military is referred to as the "client". After each principle, there will be a discussion of how it applies to current project management practices.

1. *The project manager must be delegated practically complete control of his program in all aspects. He should report to a division president or higher.*

In practice, this means that the project manager must be independent of corporate infighting and bureaucracies. Those professionals assigned to the project, must only answer to the project manager for their performance.

The project manager must be given the "checkbook" for the project. For certain very large purchases or decisions, presidential approval may be necessary, but all day to day decisions must reside solely with *the project manager.*

2. *Strong but small project offices must be provided both by the client and contractor.*

The most effective way of completing a project successfully is to have full cooperation between the client and the contractor. Both must work together on almost a daily basis to achieve the common goal: a successful, on time, on budget project.

Often, relations between the client and the contractor develop into an Us vs. Them mentality. The contractor is trying to cut corners and deliver the minimum necessary. The owner is trying to expand the scope of the project without commensurate increases in payments to the contractor.

Frequently these practices are driven by increasing pressure on the project team by their respective managements. Strong control must be maintained by both sides of the project team in order to complete a winning project.

3. *The number of people having any connection with the project must be restricted in an almost vicious manner. Use a small number of good people (10% to 25% compared to the so-called normal systems).*

Organizations, like fruit, tend to grow until they cannot support their own weight. This includes a poorly managed project team. Management of an organization is concerned about keeping everyone in the company "billable"; that is, making sure that each employee has a place to charge their time other than overhead.

When the number of jobs will not support the number of employees, it is often a tendency to overload the projects that do exist with unnecessary staff. This not only increases cost to the project, but also reduces response time, increases confusion, delays decision making, and diminishes the urgency of the team members involved.

The personnel involved no longer look to completing the project and moving quickly to the next one. Instead, they are looking for a place to charge their time until something else comes along.

4. *A very simple drawing and drawing release system with great flexibility for making changes must be provided.*

Drawings, specifications and related documents are the lifeblood of the project. They are the forms of communication between the design, development, and implementation functions. Drawings must contain the amount of information necessary to complete the implementation task, and document the work that was done, without unneeded complexity.

No battle plan survives first contact with the enemy. So no design survives implementation unchanged. There must be a consistent, straightforward method for communicating the changes that have been, or must be, made to the technical documents.

In today's computer aided design (CAD) environment, it has become easy to make drawings that are too complex. This tendency must be rejected. Additionally, it is very easy to make a change to a drawing. Tight controls must be maintained over who has access to the electronic files, who can make changes, and how those changes are recorded. Without these controls, it becomes too easy to lose track of drawing history, and the integrity of the original design.

5. *There must be a minimum number of reports required, but important work must be recorded thoroughly*.

There are two competing tendencies among unsuccessful project implementation. The first is a lack of effective record keeping. The second is to overburden the project manager or project team with unnecessary reports.

All important issues must be recorded consistently and thoroughly. This serves two primary purposes. First, it protects the project manager if there are questions relating to performance of the contract that come-up during the final phases of a project. Good

record keeping implies good control of a project. Shoddy record keeping implies shoddy workmanship. Second, good record keeping allows for a proper review of the project to learn from its successes or mistakes. A successful organization is consistently striving to improve its performance. If things go well, then good records show what should be repeated. If things go poorly, then good records show where improvements can be made.

We have found that three areas of project management must have excellent recordkeeping. The first is in the technical documents, which was addressed in item four. The second is in financial management, which is addressed in item six. The final area is in relation to the client and vendors or subcontractors.

An Owner's Issue Log should be maintained by the Contractor. The Log shows each issue that comes up relating to the contractor's obligation to the client. This may include, but not be limited to, changes, delays, potential increases in scope, or any other item that may affect the schedule, cost, or success of the project. This log should be provided to the client on a regular basis. Similarly, a Subcontractor's Issue Log should be maintained with similar information for issues that arise between the contractor and any suppliers of equipment or services.

Finally, a regular report of activities should be maintained. This may be daily, weekly, or even monthly depending on the type project, and what phase the project is in. This document will allow a timetable of events to be created, and will eliminate any questions about what happened, and in what sequence.

The second dangerous tendency in unsuccessful project management is to overburden the project manager or project team with unnecessary reports. This is common in mature, or bureaucratic, organizations. There are examples of reports being required, to show the status of the reports that were being generated. This must be kept to a minimum. Reports that are needed monthly, should not be required daily. It is not necessary to document each activity that takes place in duplicate. It is only necessary to maintain

good, consistent records on those issues that may affect the success of the project.

6. *There must be a monthly cost review covering not only what has been spent and committed but also projected costs to the conclusion of the program. Don't have the books ninety days late and don't surprise the customer with sudden overruns.*

A project manager must know where he is on an almost continual basis. This especially applies to the financial arena. The single most important factor of a project, to both the client and the contractor's management, is the cost of the project.

What cash has been spent? What commitments have been made, but not yet paid for? How much will the final cost or profit be? These are questions that can only be answered if clear, consistent records are kept of all financial transactions and projections.

7. *The contractor must be delegated and must assume more than normal responsibility to get good vendor bids for subcontract on the project. Commercial bid procedures are very often better than military ones.*

Often, a large portion of a project's costs are consumed through suppliers of material, manpower and expertise. It is important that multiple, consistent bids be obtained for any item of significant cost to the project. Frequently, companies will require at least three bids on an item or service before a commitment to purchase is made. This is prudent. Obtain more than three bids in circumstances where you can.

Only in very unique circumstances should a contract be let on a "sole source" basis. In most instances, there are multiple vendors for equivalent services. Let the free market work for you. If a vendor knows he is in competition with all of his competitors, he will do much more to provide value to you than if he knows the contract is his, regardless of price and/or performance.

Conversely, Deming argued for developing relationships that would foster alliances due to mutual benefit.

A caution is necessary here. Often, especially in mature organizations, procurement functions reside in the hands of the accounting or financial departments. Decisions are made solely on the bottom line number, rather than including other factors such as quality, service, support, or reliability that may justify going with a higher bid.

The project manager must have the ability and authority to evaluate all of the deliverables, and choose the vendor that provides the most value to the project, rather than simply the lowest price.

8. *An inspection system that meets the intent of contract requirements should be used on new projects. Push more basic inspection responsibility back to subcontractors and vendors. Don't duplicate so much inspection.*

It is much easier and cost effective to delegate authority for performance of subcontracted equipment and services to the subcontractor, rather than micromanaging the process. A successful project manager is interested in the final deliverable by the subcontractor, rather than the process in which it was derived.

Include in the contract specific performance requirements, and hold the subcontractor to them. He is much more skilled at determining what is wrong, and what needs to be fixed, than you are. When an item is critical, tie financial incentives to the performance. The subcontractor is then as interested in making things work properly as you are.

Always reserve the right, however, to witness the performance tests and inspections yourself, even if you never exercise these rights. This tends to keep the subcontractor honest.

9. T*he contractor must be delegated the authority to test his final product in production. He can and must test it in the initial*

stages. If he doesn't, he rapidly loses his competency to design other projects.

This is analogous to the above item. The contractor has the best understanding of his project, and he is in the best position to test it effectively. Additionally, without the ability to learn from the implementation phase of the project, the contractor loses the technical expertise that he would gain through seeing the project through to completion.

There is a trend, particularly in the construction industry, to perform "over the transom" projects. That is, one company will perform the initial project development and design, and another company, or the client themselves, will proceed through the implementation phase. In all cases that we have seen, this proves to be disastrous to the project.

The teamwork that could be developed between the client's and the contractor's project management fails to develop. The implementation instead becomes a blame shifting game. To the implementation contractor, all problems with the project are the fault of the design. To the design contractor, everything was calculated properly, the implementation guys cannot read the specs or drawings properly.

Often, one contractor will become allied with the owner, and shift all blame to the third party. It is a much more direct, and cost effective approach to have the design team on board throughout the implementation phase in order to see the design in action, and to be able to perform changes to the design quickly, as needed.

10. *The specifications applying to the project must be agreed to well in advance of contracting. The practice of having a specification section stating clearly which important client specification items will not knowingly be complied with and reasons therefore is highly recommended.*

In all business relationships, the contract is the king. Nowhere is this more important than in the management of the project. There must

be mutual agreement between the client and the contractor defining the scope of the project before commercial terms are agreed to. The contract specifications must then become the law of the project.

It is the project manager's responsibility to ensure that his project team follows the specifications and scope of the contract. It is also his responsibility to ensure that, if the client makes changes to the specifications or scope, then adjustments are made to the financial and scheduling terms of the contract in the form of change orders.

"Scope creep" is a dangerous, costly, and common malady of projects. It is the project manager's responsibility to control scope creep and ensure that the project stays on track.

11. *Funding a program must be timely so that the contractor doesn't have to keep running to the bank to support client projects.*

This is a fundamental principle of any project. A project, under most circumstances, must be able to fund its own cash flows. There may be instances where, at the beginning of a project, the contractor must put some cash into the project in order to get the ball rolling. However, it is important that the commercial terms of the contract are such that the contractor is upside down on cash flows no more than 30 days. To do otherwise is dangerous for both the contractor and the client.

To the contractor, the risk is evident. If cash receipts are substantially behind expenditures, then the contractor must fund the project using receipts from other projects or bank loans. Either situation creates pressure on the contractor and increases the risk of default.

This risk to the contractor is transferred to the client. Should the contractor default because of late payments, then the client will be forced to complete the project using his own resources or another contractor. In either case, the project costs and timeline are greatly increased, decreasing the value of the project to the client.

As in all other areas of project management, it is critical that the client and contractor project teams work together toward successful completion of the project, rather than engaging in a battle to see who can extract the most blood from the other party. The ownership of neither organization knows or cares how much blood you got unless the patient or projects dies. Then it is too late.

12. *There must be mutual trust between the client project organization and the contractor with very close cooperation and liaison on a day-to-day basis. This cuts down misunderstanding and correspondence to an absolute minimum.*

This has been a recurring theme throughout our discussion of project management principles. It is important enough that Johnson restates it again as a separate item.

It is critical that both the contractor and client project teams work together toward the mutual goal of a successful project. The contractor must be careful to inform the client of items that have a potential to damage the schedule, or increase the cost of the project. The client must be honest with the contractor and be willing to make adjustments to the payment or completion schedule when items under the client's control affect the project.

Above all, there must be honest, forthright, positive discussions between the client and contractor project managers on a regular, even daily, basis. This will remove the barriers that often exist between the two parties, and allow the project to be completed efficiently and expeditiously.

13. *Access by outsiders to the project and its personnel must be strictly controlled by appropriate security measures.*

The project team must, in the performance of its duties related to the project, be isolated from other entities inside its organization. This allows for a free flow of ideas, and appropriate decision making.

Except in the rarest of circumstances, the project manager and the project team are in the best position to make the best decisions

regarding the project. Influence and interference by "corporate" personnel such as accounting, executives, etc. only serves to reduce creativity, damage relationships with the client, and eliminate motivation of the project team. This is not a popular idea in most corporate structures. It is, nevertheless, accurate and important.

14. *Because only a few people will be used in engineering and most other areas, ways must be provided to reward good performance by pay not based on the number of personnel supervised.*

A successful project will employ a small number of people extremely talented at the tasks for which they are assigned. Often, these people will produce results through extraordinary efforts. In order to maintain the motivation of the project staff on the current and future projects, it is important that these personnel are rewarded based upon their performance, rather than on some corporate formulae.

It is a principle of successful management that extraordinary performers are motivated by rewards on performance, while mediocre plodders demand to be rewarded for position. A successful project manager will note this, and make decisions and provisions for compensation appropriately.

Review

Project management requires skill with people, dollars, and technology. Project management is the trade-off between time, money, and quality. Project management is a skill set that is highly desirable for any successful leader in any organization. Because of the diversity of activity required in a project, the project manager should report to a very high level in the organization. It is imperative that the client and contractor teams work together constructively toward a mutual goal of a successful project. Interference from those outside the project must be kept to a minimum. Rewards for superior performers should be based on performance, rather than on position.

Application

1. How would you as a project manager handle a young engineer who is 1000 miles from home and his wife is having their first baby tomorrow?
2. What is the effect of your decision on the engineer's productivity and the project?

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8

PROJECT SCHEDULE AND COST

Thought
Project management is the trade-off between time, money, and quality.
MOD

Tools

How does a manager control the time on a project? What is the schedule relationship between tasks? What components fail more frequently? How are costs estimated? How can cashflow be correlated to project status?

> Project management requires skill with people, dollars, and technology.
> - RAD

Balance of the items clearly requires all the skills previously addressed. In addition, tools must be available to coordinate the efforts of all team members. The tools used for projects often are related to schedule and time. Since there is a direct tradeoff between time, money, and quality, schedule is an excellent measure of performance.

Work breakdown structure

One of the first steps to project planning should be a breakdown of the project tasks. The breakdown should illustrate the way that work will be performed, costs will be reported, and data will be maintained.

The work breakdown structure (WBS) is a hierarchal representation of the tasks. It is a subdivision of all the hardware, services, and data required to complete that project. The project consists of sub-projects, which may be made up of tasks, then subtasks.

At the lowest level, several things can be accomplished from the WBS:

1. plan the work
2. control the schedule
3. estimate costs
4. authorize work and labor
5. assign responsibility
6. document requirements
7. purchase procedures
8. risk management
9. track schedule, cost, and quality.

A simple prototype can be created using a spreadsheet. Additional components could be time columns, cost columns, or other management information.

Task ID	WBS for Project
1.0.0	Project: Build something
1.1.0	Subproject 1: Analysis
1.1.1	Task 1: Marketing study
1.1.2	Task 2: Economic analysis
1.1.3	Task 3: Engineering design
1.2.0	Subproject 2: Contracts
1.2.1	Task 1: Order material
1.2.2	Task 2: Contract craftsmen

1.2.3	Task 3: Contract equipment
1.3.0	Subproject 3: Prototype
1.3.1	Task 1: Fabrication
1.3.2	Task 2: Installation
1.3.3	Task 3: Safety test
1.3.4	Task 4: Performance test

F. Lawrence Bennett in *The Management of Engineering* relates the WBS used by Skanska, a world class construction firm. [Bennett] The structure includes the department (DDDD), project (PPP), cost center (CCC), resource (RRR), and worksite details (XXX). The code may have as many as 17 digits: DDDD.PPP.CCC.RRR.XXX.

For a complete project, the coding system begins with the design stage. As the details evolve, codes are subdivided. The details may take this form.

P= harbor development project
PA = all buildings in Project P
PA1 = building one
PA1.3 = third floor of building
PA1.34 = piping system for third floor
PA1.342 = all floor drains
PA1.3421 = floor drain one for piping, third floor, building one.

Detailed WBS

This section is provided as an illustration of how to create a detailed work breakdown structure (WBS). It is not necessary to understand the technical components. Look at this as a structure or format that may be used for your particular job.

This detailed work breakdown structure (WBS) has been used by the authors in process plants. The first component of the WBS is the project designation. This typically begins with a 2-digit year code, followed by a 3-letter symbol for the client, then a 3-letter code for the specific project. An example would be 04SSI.W1P.

Following components are the sub project chores such as analysis (A), design (D), contracting (C). These are broken down into the various components. Design is further divided by trades such as electrical, mechanical, and structural. The sub project is typically another 3-symbol code. Up to this point, there is an 11–symbol designation code for the project: 04SSI.W1P.D1E.

The following illustration specifically identifies every electrical component in the plant, using a 9-symbol code. The process obviously could be extended to other components. Normally, the trades may not carry all the project codes on the front end, since this gets very long.

Work Breakdown Structure
E.AFBD.C.TN.SS

E electrical identification code

A plant area designation
F floor number of the location of the box or where conduit ends
1 = one 2 = one mezzanine
3 = two 4 = two mezzanine
5 = three
B designation of the area box (A – Z), which feeds the circuit. Numbers identify the process equipment number
D designation for the first box downstream from the area box. These use sequential letters (B-Z). “A” is used for the second letter of an area box.

C class of wiring system
A = 4-20 ma to marshalling panel
B = 4-20 ma from marshalling panel
C = controls, 120 volt, with yellow wire
E = low energy, two conductor cable
F = low energy, three conductor cable
H = 1-phase power, 120 volt, with red wire
L = low voltage controls, 24 volt, with blue wire
P = 3-phase power, 480 volt, with black wire
X = combination power
Y = power with own control
Z = combination control

T type of electrical apparatus
B = breaker
C = conduit
E = end device
F = flexible raceway
G = generator
J = junction box
M = motor
R = raceway
S = starter
W = wire

N sequential number (1-9) to identify each device if there is more than one of this type at the location.
C = common wire
G = ground wire, green
N = neutral wire, white
S = shield wire

SS Size 2-plus digit code
Conduit = the first is the inch, the second is in one-quarter inch.
Wire = AWG size
Motor = horsepower
Other = Amps
.

Consider an example for a conduit run.

E.91CB.L.C2.03.

E electrical system
9 area 9 of the plant
1 floor 1
C third major area box of its type with a separate feed.
B first box located downstream from the area box. An A would be area.
L low voltage control system
C this device is conduit feeding the box
2 this is the second conduit entering the box
03 the conduit is ¾" diameter

Identify each piece of equipment by a work breakdown code. Begin with the major codes in the design. Then as the project progresses, additional breakdown divisions are added.

This is very effective for design, purchasing, and construction. Although this level of detail is not always required, it can be readily expanded or reduced as required for the specific project.

Some systems prefer to use all numbers rather than letters. However, the numbers begin to run together if not broken up by letters.

The key point is that every project should be planned with some form of work breakdown structure. Otherwise, there is not a control mechanism to be used to verify that everything is on schedule.

Gantt

The schedule information from the WBS is often displayed graphically. Henry Laurence Gantt (1861-1919) was a mechanical engineer who became a management consultant during the latter part of the nineteenth century.

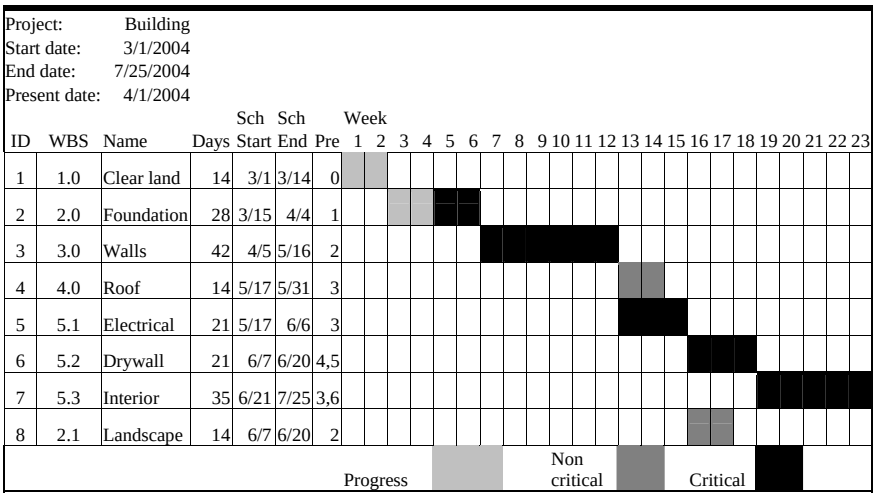
Circa 1917, Gannt developed the technique of using a simple bar chart to represent a project time schedule. [Gantt] His procedure has become a cornerstone of major construction projects such as the Hoover Dam and Interstate highway system.

Consider a very basic WBS for construction of a building.

Project:	Building			
Start date:	3/1/2004			
End date:	7/25/2004			
Present date:	4/1/2004			
ID	WBS	Name	Days	Prerequisites
1	1.0	Clear land	14	0
2	2.0	Foundation	28	1

3	3.0	Walls	42	2
4	4.0	Roof	14	3
5	5.1	Electrical	21	3
6	5.2	Drywall	21	4,5
7	5.3	Interior	35	3,6
8	2.1	Landscape	14	2

The Gantt chart is, arguably, the simplest time management tool to understand. Convert the WBS data to a Gantt chart. It shows each task with beginning time and ending time, and can show dependency between tasks.



The bar for each task stretches from the starting date of the task to the end of the task. The bars can be color coded to show if the task is running behind schedule or show which resources required for the task.

There are several limitations to the bar chart method. It does not show any relationship about technology or manpower requirements from one task to another. The expected time requirements do not reflect level of effort. For example a task may require 5 man-days

spread over 8 chart days. Finally, the chart becomes difficult to manage for projects with large number of tasks.

One of the major problems with any scheduling tool is determination of the actual time required. Most estimators tend to be optimistic. The result is that the project will be delayed past the projected time.

On the counterpoint, if the forecast is realistic, the client often complains. We have even had clients that shortened the time that we estimated.

Regardless, having a time forecast that is less than realistic will place undue pressure on the project. If time is incorrectly compressed, the project will either cost more money or the quality will suffer.

Network scheduling methods

Rather than show a bar, the PERT and CPM methods show a network of lines to illustrate the interrelationship of tasks. This is an analytical technique to control project schedule.

Two separate groups developed very similar methods at about the same time. The Critical Path Method (CPM) was developed for project management at duPont about 1957. [CPM] Its purpose was to control turn-around times for its petrochemical plants' renovation and refurbishing projects.

The CPM was based on a single time estimate for each activity. It reflected the cost concern for schedules of various lengths. It determines the critical sequence of project tasks. The total time of these tasks equal the project duration.

The Project Evaluation and Review Technique (PERT) was developed for the US Navy Fleet Ballistic Missile Office in 1958. Its purpose was to control the Polaris missile development program. [PERT]

The PERT method is based on multiple estimates for each activity's duration. This permits prediction of the probability of meeting specified completion times for each phase. Since this is the only major difference in the techniques, the terminology CPM and PERT is often used almost interchangeably.

The techniques begin with a work breakdown structure. Then a network is drawn that relates the activities in the order they are to be performed.

Next a time estimate is made for each task. For CPM this is a single number, while PERT uses its three estimates.

Then the earliest and latest start time is determined for each task. If the times are equal, this activity is on the critical path. If the task starts after the later start time, then the total project will be delayed by the tardy amount. The details will be discussed in the next section.

The chart information can be used in several ways.

1. Alternative schedules can be investigated easily.
2. Cash flow estimates can be developed based on time.
3. Costs can be reported and controlled.
4. Resource needs can be scheduled.
5. Scheduled progress can be monitored.

Elapsed time

Time is the key to all the scheduling methods. There are five different calculations required to completely define the project control possibilities.

Earliest finish time (EFT): Start from the beginning or earliest task in the project. Add the duration of the task. This is the earliest finish for that task.

EFT = EST + duration

Earliest starting time (EST): Determine the largest value of EFT for all the predecessor tasks. This is the earliest starting time for the next task. Calculate this for each task. This is a left to right or top to bottom process.

EST = largest (EFT for all predecessor tasks)

Latest starting time (LST): Take the ending or latest task in the project. Subtract the duration of the task. This is the latest start for this task. Calculate the time for all the predecessor tasks.

LST = LFT – duration

Latest finish time (LFT): Determine the smallest value of LST for all the immediate successor tasks. This is the latest finish for this task.

LFT = smallest (LST for all successor tasks)

Float: Float, sometimes called slack, is an indication of how long the task can be delayed without affecting the project. It can be calculated in any of three ways. It is the difference in late finish minus early finish, late start minus early start, or late finish minus early start minus duration.

Float = LFT – EFT
Float = LST – EST
Float = LFT – EST - duration

Critical path is the route from the start to finish that has a float for each task as zero. If any item on this path is delayed, the project will be slowed.

Activity on arrow

The network scheduling method can be illustrated in two formats, the activity-on-arrow and the activity-on-node methods. Traditionally, the activity on arrow network has been used most frequently. However, it has two major drawbacks. It is difficult to transition from a Gantt chart and it is difficult for computers to manipulate.

An activity on arrow (AoA) network is defined in terms of arrows that describe an activity. The arrows are terminated at intersections or events, which represent a completed task.

The steps to creating a network are listed.

1. An arrow represents each activity. The arrow tail starts the activity. It is terminated at the head.

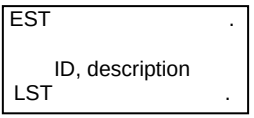
2. A node represents an event. The event is the end of some activity and the beginning of others. The event is numbered. The earliest start time is above and the latest start time is below

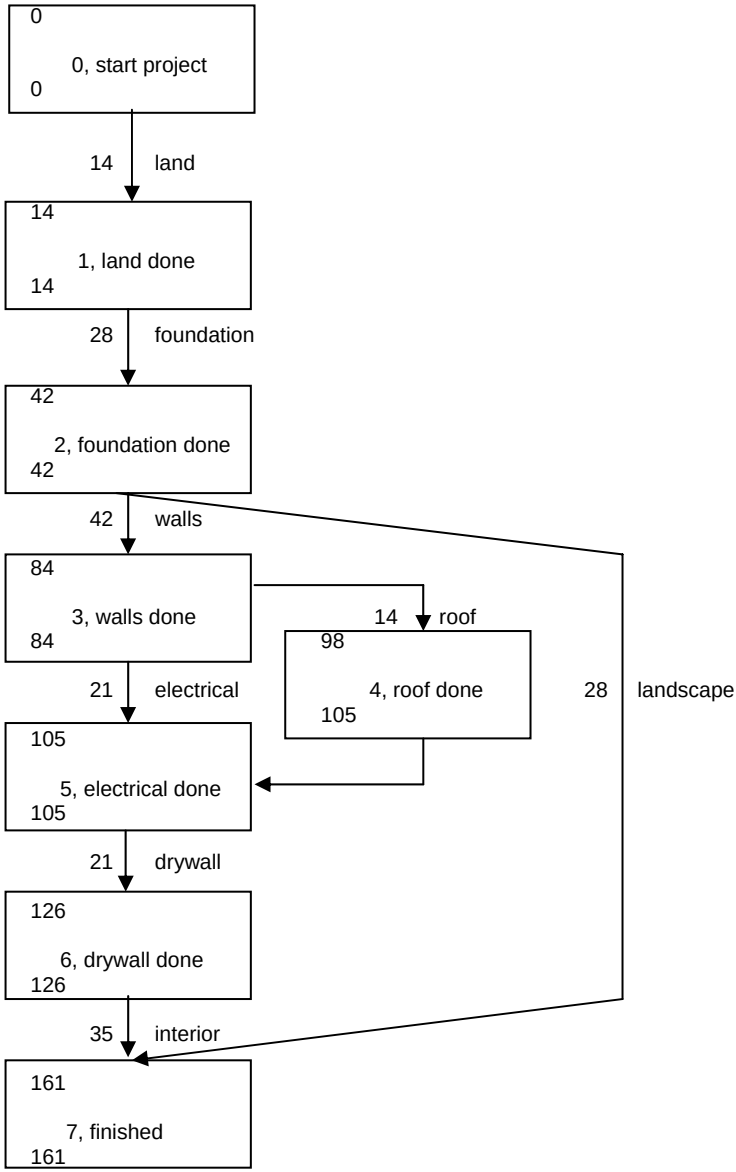
3. All activities entering an event must be completed before any arrow can leave.

4. The arrow lengths do not represent time. Label the arrow on top and place the time below.

5. The activities are numbered with the starting event and ending event. An arrow from event 3 to event 6 is 3-6.

Each node contains the ID, description of task that is finished, early start time and late start time. Each arrow has the duration and the task description. A building project is shown below in an activity on arrow network.




0
0, start project
0
14
land
14
1, land done
14
28
foundation
42
2, foundation done
42
42
walls
84
3, walls done
84
14
roof
98
4, roof done
105
28
landscape
21
electrical
105
5, electrical done
105
21
drywall
126
6, drywall done
126
35
interior
161
7, finished
161

Activity on node

The activity-on-node method resolves the challenge associated with the previous methods. It is easier to transition from a Gantt chart and it is easy for computers to manipulate. It can incorporate all the features of PERT.

An activity on node (AoN) network is defined in terms of nodes that describe an activity. The steps to creating a network are listed.

1. A node represents each activity. The shape is irrelevant.

2. Lines with arrows connect activities. These can move from left to right or top to bottom depending on the shape of the page.

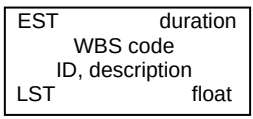
3. All activity to the left or top of a line must be completed before the activity to the right or below the line is completed.

4. The network is built based on sequence, without reference to time scale. The time values are calculated and superimposed on the network.

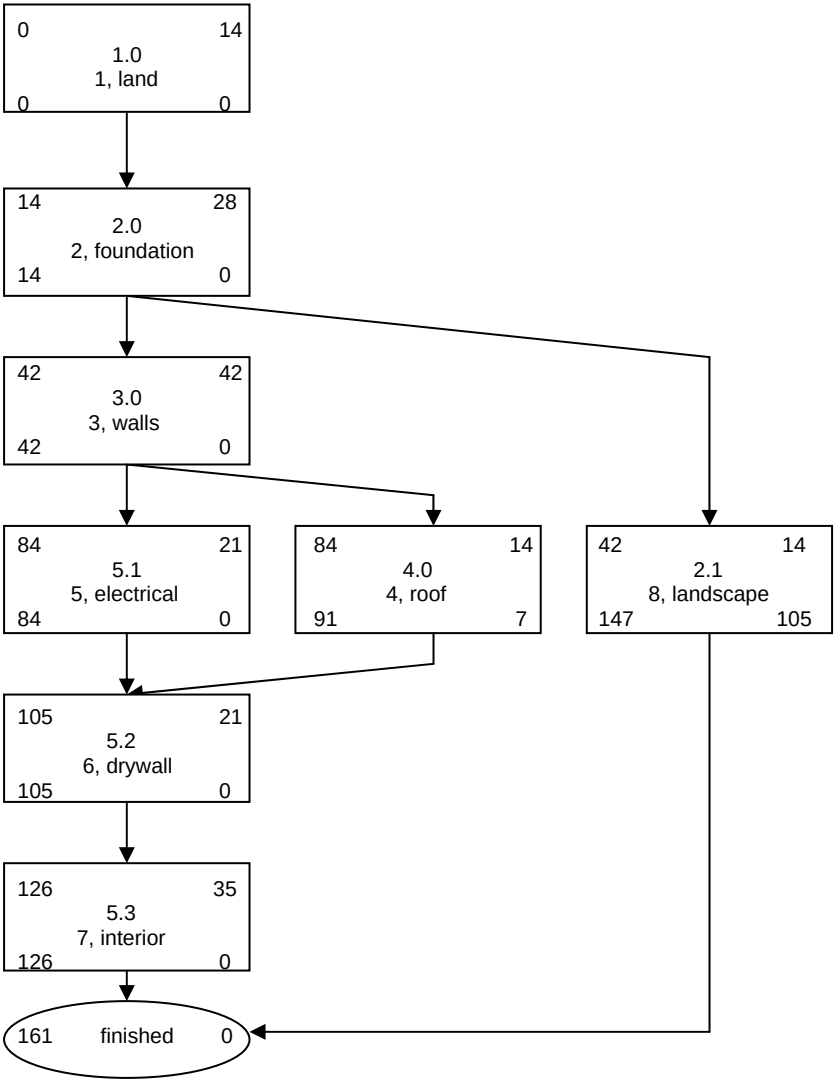
The node can be represented in a number of ways. The basic components are ID, description, early start time, late start time, and duration. It may include float or early finish time and late finish time. These are both a function of task duration and start time so are easily calculated.

Each task here shows the earliest start time (EST), the duration, the ID and task description, the latest start time (LST) and the float. Remember a float of zero defines the critical path.

These items are included in a block at the node.



Finding the critical path for the project is a two-pass process. The first is to find the earliest start times for each task from its preceding tasks and their durations. The second is to find the latest start from the successors and the tasks duration. The building project is shown in an activity on node network.



This technique is much easier to use, so it has become the predominant chart for representation of CPM and PERT information.

Probable time estimates

The major difference in the CPM and PERT system is in the estimation of the time required for each task. PERT uses a statistical method. Those calculations will be discussed in this section.

Optimistic time (a) is the time an activity will take if the project goes very well.

Most likely time (m) is the most realistic time to perform an activity.

Pessimistic time (b) is the time an activity will take if the project goes wrong.

Expected time (t) is calculated from these estimates. Most often this is assumed to follow a standard deviation or beta probability.

$$t = (a + 4m + b) / 6$$

Estimated times are generally optimistic. Therefore the expected time can be skewed to compensate for the optimism.

$$t = (a + 3m + 2b) / 6$$

The time variance for one task is then calculated.

$$\text{variance} = [(b - a) / 6]^2$$

The project variance is the sum of the variances of each of the tasks along the critical path. The square root of this is the project standard deviation (σ).

Next calculate the deviation factor from the normal distribution equation.

$$z = \frac{\text{(due date – expected date of completion)}}{\text{project standard deviation}}$$

This factor is used in normal distribution tables to give the probability that the project will be completed on time.

In addition to determining the critical path, these additional considerations on time estimates provide some potentially valuable data. The deviations give a clue to the likelihood that the project will be completed on schedule. In addition, they show vulnerable areas where resources may best be invested to keep the project on schedule.

Cost estimates

Time, cost, and quality are the triumvirate of requirements for projects. Quality was discussed in a previous chapter. Determining the cost estimate for projects is generally very dependent on the experience and skill of the estimator.

The first, and simplest, method of cost estimation uses some dimension multiplied by a cost per dimension. For example, a building may use the square feet of floor space multiplied by estimated dollars per square foot. In some cases total cubic footage of the structure is used. A related term of cost per linear foot may be used for pipelines or power lines.

This can be described as the “Rule of Thumb” method. In all cases the basic cost per dimension should be tempered by experience, market conditions, and cost of money. Although this method is relatively simple, it is often accurate enough for initial budgeting studies.

A second approach to cost estimation is to determine the quantity of the physical units of the project. For example, the cubic feet of

concrete, the board feet of lumber, the number of lighting fixtures, the number of windows and doors. Then multiply these items by unit costs for material, labor, and equipment. These factors are often published in catalogs or software available to trades practitioners.

The third level is to determine a complete bill of materials for every component required. These are frequently based on the work breakdown schedule. Then estimate the labor for each operation. These are often trade values that can be determined similar to the costs in the previous section. Although this is obviously the most accurate, it can be unnecessarily time consuming.

One rule of thumb has survived in the construction industry for nearly a century. Determine the cost of the major components of material. Labor cost will be very close to the same number; labor typically will be 40 to 60% of the total project cost.

Regardless of the cost estimation method used, it is common to add a miscellaneous value category to cover small objects that may not be itemized.

Project budget

After the best estimates for direct costs are developed, a budget is then prepared. Because of uncertainties in the contract specifications, conditions of the site, and the cost estimate, a contingency is typically added. This is generally 10 to 20% of the direct cost, depending on the confidence in the estimate. It is best that contingencies be added on an item-by-item basis, rather than on the project as a whole. This allows the estimator to adjust the estimate based on his strengths and weaknesses.

Mark-up on material must be added. This is a combination of charge for handling the material and cost for the money that is used to pay for material before payment is received. Mark-up runs from 10 to 30% of the costs of the equipment. The value depends on the risk. Very large, expensive items that have a relatively low amount of handling may have only a 5 to 10% mark-up.

Engineering typically runs from 5 to 10% of the project cost. Overhead for office and administration must also be added. The amount needed for this depends on the industry and company.

Finally, profit is added to the estimate. This value may vary depending on competition and the desire to get the job. The items beyond the direct labor and material costs should be determined at the highest levels of the organization.

Unfortunately, the sales staff may cut corners to get a project, when the organization would be better off to walk away. Low ball bids force the project manager to struggle to make the project work. It also forces management to fund this project with progress payments from another project. Ultimately, the firm gets in a cash flow crunch that may cause the demise of the business.

A project budget may have several versions, depending on the intended audience. The owner who is paying for the project will normally be interested in the total budget, including the contractor's overhead and profit. The cash flow as a function of time is primary importance.

Field personnel are expected to hold costs within their estimated budget. Comparison of actual to estimates at various phases is important.

Cost control

A variety of techniques are used to correlate the costs with the elapsed time on the project. This allows determination if the project has spent more than scheduled. All these methods obviously are related. If one technique is known, the others can be learned quickly.

In concert with the triad principle, three quantities are measured and three variances are calculated. Three measured costs are described.

1. *Budgeted cost of work scheduled (BCWS)* is the amount that has been budgeted for the tasks that are scheduled at a particular date.

2. *Budgeted cost of work performed (BCWP)* is the amount that has been budgeted for the tasks that have been completed at a particular date.

3. *Actual cost of work performed (ACWP)* is the amount that has been spent for the tasks that have been completed.

Then there are three variances in cost that can be calculated from these three cost measurements.

1. Scheduled variance = BCWS - BCWP

2. Cost variance = BCWP - ACWP

3. Total variance = BCWS - ACWP

These variances can be calculated for a determination of how close the project is to budget. A plot of the costs and variances is often used as a visual representation of project status.

Review

Project management requires skill with people, technology, and dollars. A work breakdown schedule (WBS) is used as a hierarchical representation of the tasks. The WBS forms the foundation of a scheduling system such as a Gantt or PERT chart. Critical paths are calculated as an indication of priorities. Cost estimates are then placed on the tasks. Mark-ups are added to the costs to determine a budget. Variance in budget and actual costs are periodically evaluated to determine what must be done to keep the costs in line.

Application

1. Develop a work breakdown structure for doing a homework assignment in this class. This sounds trivial, but be creative. You will be surprised at all the steps necessary.

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⇐⇑⇒

9

TIME VALUE OF MONEY

Thought
Economics is using technology
to increase wealth.
MOD

Economics _____

Does money have the same value today that it did 10 years ago? Would you rather have your money now or later? If you can get it sooner, would you be willing to give a discount on the amount. If you are willing to get it later, how much interest do you need?

In the process of creating projects, it is necessary to balance time, money, and quality. Other chapters look at the time and quality issues. This section discusses the relative value of money. The study of the value of money is called economics.

Economics is often divided into two segments: macro and micro. Macroeconomics deals with large-scale money manipulation that is often controlled by government. It attempts to look at an economy as a whole. Microeconomics is local scale money that is controlled by a project, corporation, or other entity. This chapter will focus on project economics.

Economics has been called the science of allocating scare resources. That definition is limiting. It assumes there is a fixed sized pie. If

one group gets a larger slice, then someone else must necessarily receive a smaller share. That is a negative feedback analysis, and conflicts with the fundamental premise of positive feedback.

Positive feedback philosophy is the basis for developing new technology. It assumes something that has little value can have value added through technology, thereby creating more value or wealth. This comes without reducing the wealth of others.

Consider a common example. Sand has little value. The most common component of sand, however is silicon oxide; it can be modified to create the silicon wafers used in microelectronics. A previously limited value material now has great value.

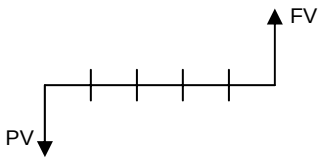
Time and interest

At the present time money has a known value, called the present value or purchase price, *PV*. At some time in the future, the same money will have a different value called the future value, *FV*.

Two things relate the values. Interest rate, *i*, is the percentage of a sum of money charged for its use. This is also called the discount rate. Interest is based on a period of time. In most cases it is one year, but it can be any interval. The number of interest periods is *n*.

It is assumed that all money transfer is at the end of a period. If it is at the beginning, the present value must be calculated from one period in the future.

The simplest calculation is for a single payment exemplified in the cashflow diagram. A value below the line is negative or paid out. A value above the line is positive or received in. Hash marks without arrows simply identify a time period.



Equations for calculating the values are shown below. In addition, many texts give an abbreviation for the factor that relates the value to be calculated to the known value. In addition, we will show the equivalent spreadsheet command, *(Microsoft Excel 2000)*, since that is the most common way of calculating value of money. [Excel] The Excel formulae start with an "=" sign

Find the amount of money that it would take in the future, FV, which has an equivalent value to the present worth, PV.

$$FV = PV * (1+i)^n$$

=FV(*i,n,0,PV,*)

Conversely, when the value in the future is known, determine the present value.

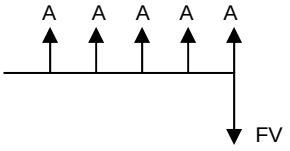
$$PV = FV * (1+i)^{-n}$$

=PV(*i,n,0,FV,*)

Uniform series

Rather than single payments, a much more common practice is to have progress payment amounts, A. If these are at regular time intervals, the process is called a uniform series. When uniform amounts are applied to the future value and present value, four new relationships are established. Some authors treat these as equivalent uniform annual cost (EUAC).

Future value and uniform amounts are illustrated in a cashflow diagram.



Series compound amount is the future value found from the uniform amount.

$$FV = A\left[\frac{(1+i)^n - 1}{i}\right]$$

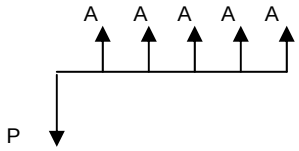
=FV(*i*,*n*,*A*,,)

S*inking fund* is the uniform payment found from the future value.

$$A = FV\left[\frac{i}{[(1+i)^n - 1]}\right]$$

=PMT(*i*,*n*,*0*,*FV*,)

The cashflow diagram demonstrates the present worth and the uniform payment amounts.



Series present worth is the present value found from the uniform payment.

$$PV = A\left[\frac{(1+i)^n - 1}{[\,i(1+i)^n]}\right]$$

=PV(*i*,*n*,*A*,,)

Capital recovery is the uniform payment found from the present value.

$$A = PV\left[\frac{i(1+i)^n}{[(1+i)^n - 1]}\right]$$

=PMT(*i*,*n*,*PV*,,)

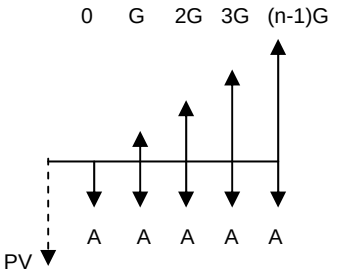
Capital recovery on salvage is a modification of the capital recovery relationship. The future value of the salvage, S, is converted to a uniform payment and subtracted from the present value convert to a uniform series. Alternately the salvage value is transferred through the present worth as developed above.

$$A = (PV-S)\left[\frac{i(1+i)^n}{[(1+i)^n - 1]}\right] + iS$$

=PMT(*i*,*n*,*PV*,*S*,)

Gradient

A gradient is a value that increases or decreases at a rate for each time interval. An arithmetic gradient is an integer multiple during each interval. It can have either a uniform amount or a present value, PV.



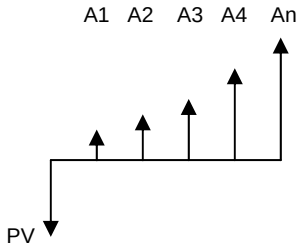
Arithmetic gradient uniform series is calculated from the gradient value, G, after the first interval.

$$A = G\left[\frac{1}{i} - \frac{n}{[(1+i)^n - 1]}\right]$$

In a similar manner the present value is derived from the first gradient, G.

$$PV = G\left[\frac{(1+i)^n - in - 1}{i(1+i)^n - i}\right]$$

A geometric gradient grows by a rate, g, during each interval. Therefore the change in amount varies according to an exponential curve.



The present value depends on two rates, the interest and the gradient, as well as the first amount in the series.

$$PV = A1\left[\frac{1 - (1+g)^n(1+i)^{-n}}{i-g}\right]$$

Frequently, the gradient rate is equal to the interest rate. Then the equation reduces significantly.

$$PV = A1[n(1+i)^{-1}]$$

Nominal interest or APR

Nominal interest rate, r, is also called the annual percentage rate (APR). It is the reported rate that is compounded multiple times M, per year. It may be stated as 18% APR or 1.5% per month. These are equivalent. However, they are not the effective interest rate.

*Effective annual interest rat*e, i_a is also called annual effective yield (AYR). It is substantially greater than the nominal rate.

$$i_a = [1 + (R/M)]^M - 1$$

The most insidious effect is continuous compounding at a nominal rate. This creates an exponential growth.

For a single payment, the relationships are simple, but expensive.

$$FV = PV[e^{rn}]$$

$$PV = FV[e^{-rn}]$$

Perpetual and rule of 72

Present value of perpetuities is a common way to determine the worth of an ongoing, perpetual uniform payment. This is valuable in evaluating annuities, insurance, and lotteries.

$$PV = A / i$$

Rule of 72 is a quick technique to determine how long it takes for the present value of money to double. The number of periods is determined from 72 divided by the interest rate.

$$n = 72 / i$$

Rate of return

Project economics are based on recovery of money. A variation of present worth has been used in all the calculations to this point. Projects typically can be implemented with a number of different alternatives. Therefore, the economic analysis is a comparison of alternatives.

Internal rate of return (IRR) is the break-even interest rate i* at which the present worth of a project is zero. With a present worth of zero, we are ambivalent and do not particularly care about the project.

$$PV(i^*) = PV\ cash\ in - PV\ cash\ out = 0$$

The calculation of IRR is an iterative process. Begin with the number of time intervals, n, and the present, future, or uniform amounts. Guess at an interest rate and calculate the present worth. If it is positive increase the interest rate. If the present worth is negative decrease the interest rate. Continue estimating interests until the present value is adequately close to zero.

It is not necessary to laboriously perform this calculation. Many calculators and spreadsheets have the i* function built into the spreadsheet package (Microsoft Excel 2000).

=IRR(*values, guess*)

Investors have a minimum acceptable rate of return, MARR. This is the interest that must be exceeded if the project is to be funded. Compare the calculated rate of return with the MARR. If the IRR is less than the MARR, then the project should not be done.

Typically the analyst will go back and tweak the costs associated with the project until an acceptable IRR is obtained. This is a very important process since it forces the analyst to have a better handle on the project, and, as a result, the project is more likely to perform as expected.

Incremental analysis

There is an anomaly with simple IRR analysis. For projects with a short term and low investment, the IRR may be very high. However, that project may not have the greatest present worth. This is because present worth is an absolute dollar measurement while IRR is a relative measurement.

Incremental investment analysis is used to compare the difference in investments for projects.

Begin with a table for the number of years. In year zero, place the present worth or purchase price under each project. In year one,

place the future value or uniform amount under each project. Continue for all remaining years.

Next create a column that is the difference in the cashflow between the two projects at each time interval. This gives a sequence of incremental values.

n	Project1	Project2	2 –1
0	P10	P20	P20 – P10
1	F11	F21	F21 – F11
2	F12	F22	F22 – F21
	IRR1	IRR2	IRR2-1

Next calculate the rate of return on the differences. If the rate of return on the difference exceeds the MARR, then the incremental investment should be made to do the project.

Payback _____

Payback is simply how long it takes for net receipts to equal investment outlays. Conventional payback is calculated ignoring the time value of money.

Discounted payback includes the interest on the money. For a project with the same cash inflows each year,

Payback = Cost / uniform annual benefit

For projects with varying cash inflows, these inflows are added until the cost is equaled.

For payback analysis, all costs and all revenue prior to the payback are included without considering differences in their timing. All consequences after the payback time are completely ignored.

This is obviously a simple technique. It also has some serious constraints. Nevertheless, it is still a popular indicator since it gives the time to recover the investment. It is important to note again that

the simple payback ignores the time value of money, which may be very high for an expensive, or lengthy, project.

Benefit cost ratio

Benefit is simply another way a describing the positive cash flow or value. Cost describes the negative cash flow or value. When comparing projects, these are calculated using incremental analysis. The ratio is the benefit to cost ratio. If the ratio is greater than 1, the incremental project should be done.

```
BC = PV(benefits) / PV(costs)
```

Tax implications

The taxes on income and investments will influence the value of the project. Calculate the value of the project before income tax (BFIT). Financial types refer to this as EBITDA (Earnings Before Interest, Tax, Depreciation and Amortization). Calculate the value of the project after income tax (AFIT). The process can be used with all the techniques including present worth, incremental analysis IRR, and payback.

The value of the analysis is it reflects the real net worth, since different investments have alternative tax implications. BFIT may be a better indicator of projects, but AFIT is the better indicator of value to the organization. After all, the purpose of projects is not for the projects sake, but to increase the value to the organization.

Table of terminology

Numerous symbols are used for economic comparisons. These are shown in a table.

Symbol	Definition
I	Interest rate per interest period, often one year
N	Number of interest periods
PV	Present value of money
FV	Future value of money
A	Amount of money at end of period in a uniform series for n periods
G	Arithmetic gradient, uniform period change in amount of money
G	Geometric gradient, uniform rate of cash flow change.
R	Nominal interest rate per interest period
M	Number of compounding subperiods
S	Salvage value is cash recoverable at the end of a project.
PV*, FV*	Amount of money flowing continuously during one period

Commentary

Determining which project is the best choice is less than straightforward. Many issues enter the evaluation, besides the pure economic calculations.

There are biases and preferences from the management and the project team. These are difficult to eliminate, and the biases may even be desirable. With practice, there can come that ‘gut feel’ that this is right. However, gut feel can also be wrong.

Most organizations place some criteria on selecting projects. Traditionally over many years, an IRR of 15% AFIT has been acceptable, assuming the project was well defined. For higher risk ventures, the MARR often moves toward 30%.

Other companies place great emphasis on payback. Traditionally, a 3-year term has been acceptable. As risk increases, the term is frequently shortened toward 1 year.

With these more stringent criteria, one must wonder if any projects will ever be built. That is not the point. The objective is to compensate for higher than normal risk. There is no future in investing money in ventures that do not increase the wealth of the stakeholders.

Review

Money has different values, depending on the time it is obtained. The worth of the money is dependent on present, future, and uniform amounts. There are multiple projects on which to invest money. The preferred project is determined by incremental analysis that compares the projects. The methods are investor rate of return, payback, and benefit to cost ratio. The return after taxes is a better indicator of worth.

Application

1. *Retirement savings*. Given: Uninflated growth of capital is 3% per year. You begin paying into a retirement program when you turn 25. After25 years, you begin collecting $50,000 annually. You collect for 40 years.
   a. What is the present value of the annuity?
   b. What are your annual contributions to have that amount in the account?
   c. How much will be in the account when you begin collecting?
   d. Is the annual contribution a reasonable amount to expect you can contribute after you pay taxes on a $50,000 salary?
   e. Wait 35 years to begin collection and receive for 30 years, do you contribute more or less each month?
   f. To retire at 50, what is the best approach?

2. *Auto Purchase.* Given: A new university graduate purchases a new Whizmobile for $25,000. She borrows the money at an interest of 1%/mo. Loan period is 60 months.
   a. Find, future value, if a single balloon payment is made at 60 months.
   b. Monthly payments if made at the end of each month.
   c. Total amount paid (cash-flow)
   d. Total Interest paid
   e. Amount unpaid after 12 months

a. Assume the same monthly payments were deposited in savings program. The account pays 1% per month. How many months would it before you had $25,000?

3. *Rule of 72:* Given: $1000 to invest and the interest is compounded 10% per year.
   a. How long will it take to double your money?
   b. What is the effective monthly interest rate?

4. *House Purchase.* Given: Engineer with a salary of $40,000 per year. Federal and state income tax of 25%. Mortgage company will lend 2.5 times the annual salary for a house. Interest rate is 7% per year. Loan period is 30 years. Use uniform series of annual payments procedure.

   Create a spreadsheet with the following columns. Calculate the values for the end of each year.

   a. Principal remaining at start of year
   b. Interest owed for year
   c. Annual payment
   d. Amount of payment that is principal
   e. Total payments to date
   f. Total interest to date
   g. Double the payment.
   h. Apply the extra amount to principal only.
   i. Tabulate the lower principal remaining.
   j. How long does it take to pay off the loan, with double payments?

   Calculate the following items for a 15-year loan.
   a. Total cash flow (amount paid).
   b. Total interest paid.

   The next sections should be added to the spreadsheet after taxes.
   a. Effect on income tax for interest paid
   b. Cash flow after taxes

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10

OOPS, WHEN THINGS GO WRONG!

Thought
The problem is to find
the least erroneous solution.
Justice Benjamin Cardozo

What happens _____

What do you do when a piece of equipment fails, a contract is breached, or a design is challenged?

Technical training is focused on how to design or analyze a piece of equipment. Seldom does it involve the skills necessary to resolve disputes or resolve discrepancy issues.

What is the role of a techno-leader in error handling? A sign in my office is very astute.

> Engineers do not run the world, but make the world run.
> - sign

Technical specialists determine what makes things work. As a result, they often become the first responders in forensic investigations. They provide the basis for attorney's arguments during litigation.

By nature and training, techno-specialists assume that they are right and their way is the correct way. However, there are usually experts on both sides of an issue. How is this discrepancy resolved?

English common law provides the basis for our system of jurisprudence. Notice a comment from an esteemed jurist. Lord MacMillian, Lord Chief Justice of England, wrote ”In almost every case except the very plainest, it would be possible to decide the issue either way with reasonable legal justification.” The American jurist, Justice Benjamin Cardozo said, “The problem is to find the least erroneous solution.” [Bennett]

Leadership issues

A project is an extensive undertaking of multiple tasks for a definite purpose for a set time. To determine the status of a project, it is necessary to determine the standing of all of the issues involved. As we observed in the beginning chapter, these are not ideals. They are the principles that define leadership.

1. Vision
2. Ethics & morality
3. People
4. Time
5. Money
6. Technology
7. Quality
8. Safety
9. Environment & natural resources
10. Legal

The impact of these on a project is investigated in various contexts. A process of using them to evaluate the project is then developed.

Projects trade-off

The return on a project is simply the income less the expense. This is true not only in a monetary sense, but can be applied to relationships. The objective of a successful endeavor is to maximize return.

The classic trade-off for a project is time (t), money ($), and quality (Q). These components are actually constraints that can be combined into an energy equation.

project energy = maximization of (Q * $ / t)

The money flows from a customer to the project, then to the supplier. The goods flow in the opposite direction. The customer energy is to increase quality and decrease money (expenses), in the measured time. The supplier energy is to decrease quality and increase money (price), in the time.

In a closed system with no other influence, the total energy is zero. Applying this principle, the supplier energy must equal the customer energy.

$$[(-Q_s)\ (+\$_s) / t_s] = [(+Q_c)\ (-\$_c) / t_c]$$

There is, therefore, a natural tension that develops between a client and supplier. The key purpose of a leader is to produce a winning combination with the interests of both the supplier and client balanced.

Value is the ratio of money to quality. This ratio is relatively constant, with some constraints. If quality decreases, it is expected that the money will decrease. If quality increases, price can be expected to increase. You cannot get “something for nothing.” There is a minimum limit on quality and a maximum limit on money that a client will accept. The converse is true for the supplier.

Negotiation is the process of bringing the quality and money, which are the interests of both the supplier and the client, into balance. The

basis of all disputes is a perceived disparity in the quality, money, time, or some combination of all three.

The perception of the players is often a major difficulty. Perception is reality to the observer. Outside viewers may have a different perception, and therefore see a different reality.

Skills

Three skills are required for any project – people skills, money skills, and technological skills.

As people skills are often the most important, they are dealt with first. The first question is "is this the right person?" Is the person in the right place? Is the person performing adequately?

These questions require a substantial knowledge of the individual. What is his temperament? What is his relationship style? What is his experience? Is he flexible? Is he a problem solver? Does he understand the difference between doing the project and making the project successful for the client and the supplier? No one is perfect on all these issues. What is your plan, then, to balance and compensate for the weaknesses?

The technological skills apply to both the person and the equipment. Is the technology adequate to do the job? What are alternative technologies that may be better quality, more cost effective, or better for the time? Similarly, does the person understand the technology and its applications?

The money issue applies to revenue and expenses? Is the income being received? Is it adequate to do the job? Are the expenses in control? Can expense be managed without adversely affecting quality?

How to tell

How can you tell when something is going wrong? In some circumstances a catastrophe occurs. There is a big event that grabs your attention. In most cases, a disaster is the result of attrition. Little things start compounding. In those cases, evaluation of the situation and possible options returns to the three constraints. Quality is suffering, money is out of line, or the schedule (time) is too long.

Often the first indication that something is amiss is a feeling. It is often not definable, but there is a sense that things are not as they should be. Generally, this is caused by subconsciously picking up clues about the three constraints that have not been adequately resolved. If there is a feeling, perform an analysis to see which of the three constraint items is out of bounds.

This analysis can be a series of questions or it can be a flowchart. Develop the questions or flowchart before the process begins. These are the tools for maintaining control.

Obviously, if there are questions or decisions to be made, then there must be some boundary for each condition. The chapters on quality and project management gave several examples for determining these boundary conditions. Is the quality in limits? Is the schedule on track? Are the expenses under control?

Any item that has a negative answer then requires another series of questions. Is it temporary or on going? How long has it been going on? If it is on going, there is a final series of queries. Is the problem resolvable? Can it be done within the quality, time, and money constraints? If either of those questions are negative, then one question remains, is it time to bail out?

Leadership decisions

It has been often stated that a picture is worth a thousand words. The following flowchart is a good monitoring tool that should be

evaluated on a regular basis. It has been developed from extensive experience in conflict resolutions, forensic investigation, and root cause analysis.

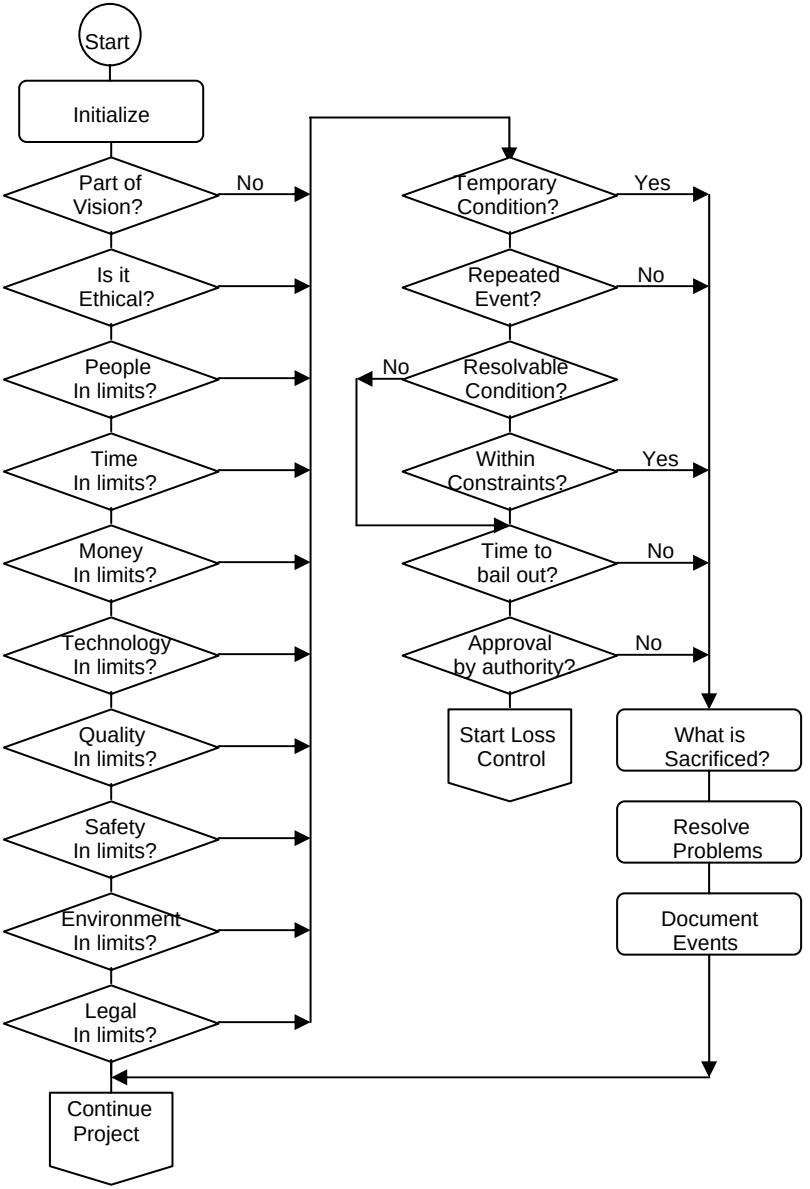
This flowchart gives the series of questions to ask. Some of these questions need to be answered with a probability function, rather than a yes/no response. Nevertheless, ultimately there comes the point of a go, no-go decision.

Whether an experienced leader or a novice technologist, the questions in the flowchart are the series of decisions that must be made. The novice may not have the judgment to make precise evaluations; nevertheless, he can develop a plan of attack to hone that experience and skill.

If, as a result of this analysis, the decision is made to continue the project, then the evaluation process must be continued. It is not necessary for this to occur daily, but it should be performed regularly. Moreover, when there is a sense of something being amiss, this process provides a method of detecting the source.

If the decision is made to cut your losses and run, then the real challenge begins.

Leadership & Project Evaluation Process



Risk management

Often a specialist will be requested to pick up the pieces when there has been a catastrophe or a project failed to perform as expected? There is a very methodical process that must be followed, if risk is to be minimized.

1. Stop the loss
2. Gather data, photos, physical evidence, personal statements
3. Evaluate options
4. Determine consequences
5. Prepare report (written, verbal, file)
6. Make decision whether to attempt recovery
7. Start recovery

Stop loss

The first objective is to stop the loss if it is continuing. The procedure used depends on the nature of the problem. Some of these require professional or expert assistance.

If there is personal injury, obviously reducing the impact or providing assistance comes first. However, do not move someone, unless they are in immediate danger. Moving may cause additional injuries. Request professional help, even if you are certified to render assistance. Personal injury is a prevalent form of legal claims.

In the event of a fire, stop the progress if it is small enough. Do not expose yourself or anyone else to injury to reclaim anything. No item is worth the exposure that fire causes. Often the biggest risk is smoke inhalation, which exposes the body to toxic substances.

Seek professional assistance to assure the fire is under control. I have investigated numerous cases where the fire department was on site to extinguish a blaze. After they left, a smoldering substance under a cover proceeded to cause a secondary blaze. The second fire often causes much greater damage than the initial incident.

If investigating an incident, be cautious to determine the original cause. It is easy to be deceived by the secondary origin.

If the problem is a mechanical, electrical, or chemical malfunction, remove the energy source so it cannot cause more damage.

If the incident is a people problem, remove them from the process. This must be done with care and finesse. Determine established policy and legal requirements.

If the incident is financial, control the flow of cash. This may be by placing constraints on who can spend. Although this is the issue that often gets the most attention, it is also the easiest to monitor and to control.

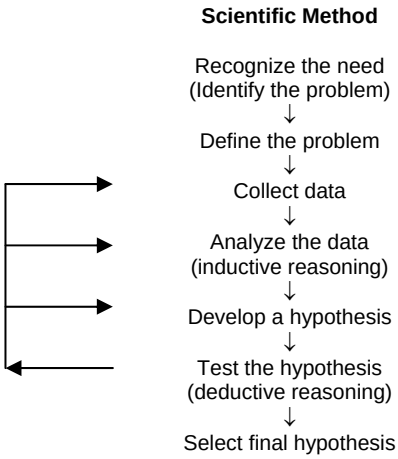
Gather data

Gathering data to be used for later evaluation as well as justification of actions is the next step to take. Data takes many forms. It can be documents, photos, personal statements or physical evidence. Each has its own value, but the principles are equivalent.

Any evidence collected must be protected in as pristine condition as possible, for future evaluation by others. Only representatives of the owner or law enforcement can collect evidence. Wrap the material, label it, and store in a secure location.

There are numerous standards for gathering data that are published by professional organizations. These address specific, often detailed, requirements for their clientele.

The National Fire Protection Association (NFPA) is a major source of these documents. Their *Guide for Fire and Explosion Investigations* is the authority across the industry. [NFPA] It includes basic methodology using the scientific method to develop a hypothesis. Although the guide is specifically about catastrophes like fire, its principles are valid for any risk management.



Gather information from all sources. There are two types of observers. Fact observers are ones that have first hand experience with some facet of the problem. Expert witnesses are ones that research and analyze the information and come to some conclusions. They have special knowledge and education.

When the expert is gathering sources of information, first-hand observers are preferable. Hearsay information must be filtered, but may indicate a direction of research.

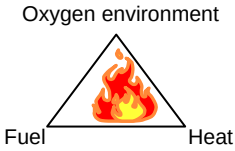
If it is possible for the expert to observe the problem after the damage, but before it is cleaned-up, he may also become a fact witness.

Record all observations for later analysis. Take detailed photographs and log each photograph so it can be identified later. In today's digital society, photographic evidence is always questioned. This is particularly true of digital photography. The most credible photographs use Polaroid technology, because of their inability to be altered. It is also the least durable, most expensive and least convenient. Evaluate the situation and determine what technology is most appropriate. Any picture is better than none.

Putting out fires

Fire investigation is an excellent analog for any problem. The terminology is embedded in our language, and is relatable to anyone. ‘Putting out fires’ is often used as a metaphor for ‘problem solving.’ Although fire investigation is a very analytical process that requires substantial knowledge, training, and experience, it is also very intuitive.

To begin, three things must be present to have a fire - fuel, oxygen or environment, and ignition or heat source.



Remove any one of these and a fire cannot exist. Similarly for any failure or breach, there must be fuel, an environment for the problem to develop, and a heat source that ignites the conflict. Elimination of one or all of these factors before ignition is much easier than trying to contain the damage once the incident has occurred.

Origin

What is the point of origin? Begin with the big picture. Look at all events and surroundings. From these, develop the pattern that points to the origin of the conflagration. There should be a classic “V” shape that progresses from the origin of a fire. Flames will burn up and out from the point of ignition. Very little damage will be below the point of origin. The smoke and burn pattern will be in the direction of airflow. The exception is a very flammable item than may burn down.

The pattern is observable from the perspective of the surrounding area, down to the very detail. Catastrophic damage may obscure the detailed pointing.

Years of experience can provide background, previous observations, and a sense of feeling. This very exposure may cloud some observations since the observer may be too close to the problem. An insightful, knowledgeable analyst will often notice a subtlety first.

On many occasions I have worked with technicians who ask a probing question compounded with a statement. “Why can you come here and find a problem in a few minutes, when I have been working with this everyday for years?” The answer is almost always the same. “You gave the answer in your question. You are too close to the problem.” To use the common vernacular, it is hard to see the forest for the trees.

> The details obscure the vision.
> -MOD

At this juncture only the location or origin of the problem has been identified, not the root cause.

Cause

What caused the failure? Begin with detailed observations and then move to a generalization about the area. This involves considering all possibilities in the area of the origin. List all possibilities, no matter how obscure.

The cause must have fuel, necessary environment, and heat source. Eliminate possibilities one by one if they do not have all three components. For each possibility, note why it was eliminated.

Continue to eliminate possibilities, until arriving at the most probable cause.

Analysis

Why did the failure occur? Begin with specifics rooted in technology. Technology primarily applies to the energy source, which may be a mechanical, electrical, or process issue. In virtually all systems, all three exist; therefore, it becomes a task of finding which source is the primary cause. Then determine the component that had the problem.

There is generally more than one issue that causes a failure. Analysis involves finding all of the conditions that came together at the time of the failure.

> Seldom do systems have problems when only one component is improper. Failures and catastrophes are the result of multiple conditions.
> - MOD

The components of a system are actually quite limited.

Component	**Alternative realization**
Input	For energy source or data
Protection	Safety system or error checking
Change	Switch, valve, or decision
Path	Conductor, pipe, or method
Connection	Joint or fitting
Sensor	Monitor or detector
Control	Feedback system
Warning	Alarm or annunciation
Output	Display or result
Process material	Stuff that is handled

Each of these is investigated to determine if it was part of the problem. There is seldom a yes/no answer, so it may be necessary to assign probabilities to each question. Eliminate the components that are not involved. Continue the elimination until the most probable component or components are identified.

Based on a quality assumption, the overriding consideration is very similar to the physicians' Hippocratic oath, "Above all, do no

harm." It is more important that the system not harm than it is for the system to operate in a particular way.

With that theory in mind, some items take on a greater precedence. These are safety components, which include protection, feedback, and warnings. *Protection* is the safety component that should isolate the energy source if something goes awry. *Feedback* is closed loop control that provides compensation if something gets out of range. Open loop control is not stable. *Warning* is the message about risks to preclude something going awry.

Component	Function
Protection	Isolate
Control	Compensate
Warning	Preclude

External

As noted earlier, seldom is it one component that causes a failure. Once the components are identified, the external influence that contributed to the failure is researched. The problem could be one of design, manufacturing, or application.

Design is the systematic process of contriving plans for a particular purpose. Design implies a special knowledge about the technology that will provide a product for the intended purpose and will operate safely. Design compromises are necessary to produce a viable project. Nevertheless, the designer is expected to know and should know the technical problems that could occur and take actions to mitigate them.

Manufacturing is the process of putting components together into a working system. Manufacturing implies the ability to create, produce, or turn out a finished product. Manufacturing is often done with a relatively low margin. This is necessary for profit in a competitive environment. Efforts are made to reduce costs as much as feasible. As a result, compromises may be used to save money. These compromises must be commensurate with quality and safety.

Proper management techniques, appropriate design, and suitable manufacturing and testing procedures will provide a safe product. Not using available safety procedures will expose the manufacturer and end user to unnecessary risks.

Application is how the system is employed. This is under the direction of either the user or owner. The system is typically intended for use by consumers, without explicit technical knowledge about the design, manufacturing, or constraints. The user has the responsibility to apply the device or system in a prudent method. The user is expected to not work on or modify the system. Furthermore, he is expected to not abuse, physically damage, or overload the device.

If a failure occurs, list all the possibilities. Eliminate possibilities one by one if they do not have a contribution to the failure. For each possibility, note why it was eliminated. Continue to eliminate possibilities, until arriving at the most probable cause. It could be any one of the above areas.

If the proper methodology is recognized and used in design, manufacturing, and application, as well as management, a catastrophe would not occur.

Opinion

After looking at the origin, cause, analysis, and external components, a hypothesis can be developed. This is based on the most probable results from each of the stages.

The hypothesis is tested against all the facts and probabilities. This is an evaluation in context of the gathered data and analysis. If there is any deviation from the theory that cannot be resolved, then a new hypothesis is necessary. This is an iterative process. It is often useful for the examiner to have a “sounding board” of another professional who play’s the devil’s advocate, shooting holes in theories as they arise.

A final hypothesis is obtained when all the available information correlates reasonably. The opinion is a judgment based on special knowledge. It is a belief or conclusion held with confidence based on evaluating all possibilities and developing the most probable scenarios.

Elizabeth Drew (1887-1965) was a poet and author who wrote *The Modern Novel*. [Drew]. Her observation is a succinct perspective on decision making.

> The world is not run by thought, nor by imagination, but by opinion.
> - Elizabeth Drew

Opinions must be based on ethics, character, and outstanding technical skills.

Responsibility

One of the most common arguments proposed for a failure is negligence. Negligence can be allocated to the design, manufacturing, or application. Negligence requires four components: duty, breach of duty, proximate cause, and damages.

Duty is an act or a course of action that is required of one by position, social custom, law, or religion [Dictionary]. Duty is the responsibility to perform what is reasonably expected.

Breach of duty is failure to perform what is expected or required.

Proximate cause is an event sufficiently related to a legally recognizable injury to be held the cause of that injury. There are two elements needed to determine proximate cause: the activity must produce a foreseeable risk, and the injury must be caused directly by the negligence. [Wikipedia]

Damages are the harm suffered from the act.

Four questions must be asked to determine if there was negligence.

Was there a duty to perform?
Was there a breach of the duty?
Was the proximate cause a result of the breach?
Were damages the result of the proximate cause?

If any of the questions is negative, then there is no negligence.

Non-technical

The technical aspects of the investigation are complete. Now comes the challenge for leaders, make a decision about recovery. This will involve as many evaluations as the technical components. Again these should be determined by making a list of possibilities. Possibilities are then eliminated until a most probable approach is found.

Several questions should be considered. What is the additional cost? Can negligence or responsibility be established? What is the probability of success? What can be recovered? Is it worth it?

This process will give a direction of whether to start recovery or to abandon the problem and count it as experience.

Review

Occasionally things go awry. The objective is to find the least erroneous solution. To determine the status of a project, it is necessary to determine all the leadership issues involved. Use these standards as questions to determine where the deviation occurs. Then the process of risk management is started. The first part is the technical issues: stop loss, gather data, determine origin, find cause, conduct analysis, research outside influence, and develop an opinion. Then the non-technical process is determining whether to recover or move on.

Application

1. Give one example of a problem that could arise with each of the 10 leadership issues.
2. Give one example how each of the 7 risk management issues can be accomplished.
3. Give one reason why an organization might decide to not recover damages.

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11

REVIEW VIA APHORISMS

Thought
There is nothing new
under the sun.
Solomon

A pithy saying _____

Numerous topics, ideas, and precepts have been covered. A summary of the principles is accomplished by a review of the aphorisms in the chapters. An aphorism is a tersely phrased statement about a truth or opinion. It is from the Latin by way of Old French and means to define. Leaders often use these brief sayings as quick reminders of principles.

The aphorism list is sayings the authors have used. Since everything we know is built on other's work, it is sometimes difficult to know if these are original, modifications of others, or are old adages. Credit has been given for those which we are aware. If there has been an oversight, we apologize and please let us know.

The marketplace does not tolerate dishonesty. An inferior company in any area will be driven out.

Quality is the pursuit of excellence.

Quality is integrity.

Quality is the major part of equality

The Ten Commandments are absolutes that are the traditional foundation of United States laws.

If it is not in writing, a disingenuous party will change the deal, and you will lose.

At-will employment has been replaced by laws which prohibit discrimination, whether real or perceived.

Project management requires skill with people, dollars, and technology.

Project management is the trade-off between time, money, and quality.

Economics is using technology to increase wealth.

The details obscure the vision.

Seldom do systems have problems when only one component is improper. Failures and catastrophes are the result of multiple conditions.

Principles

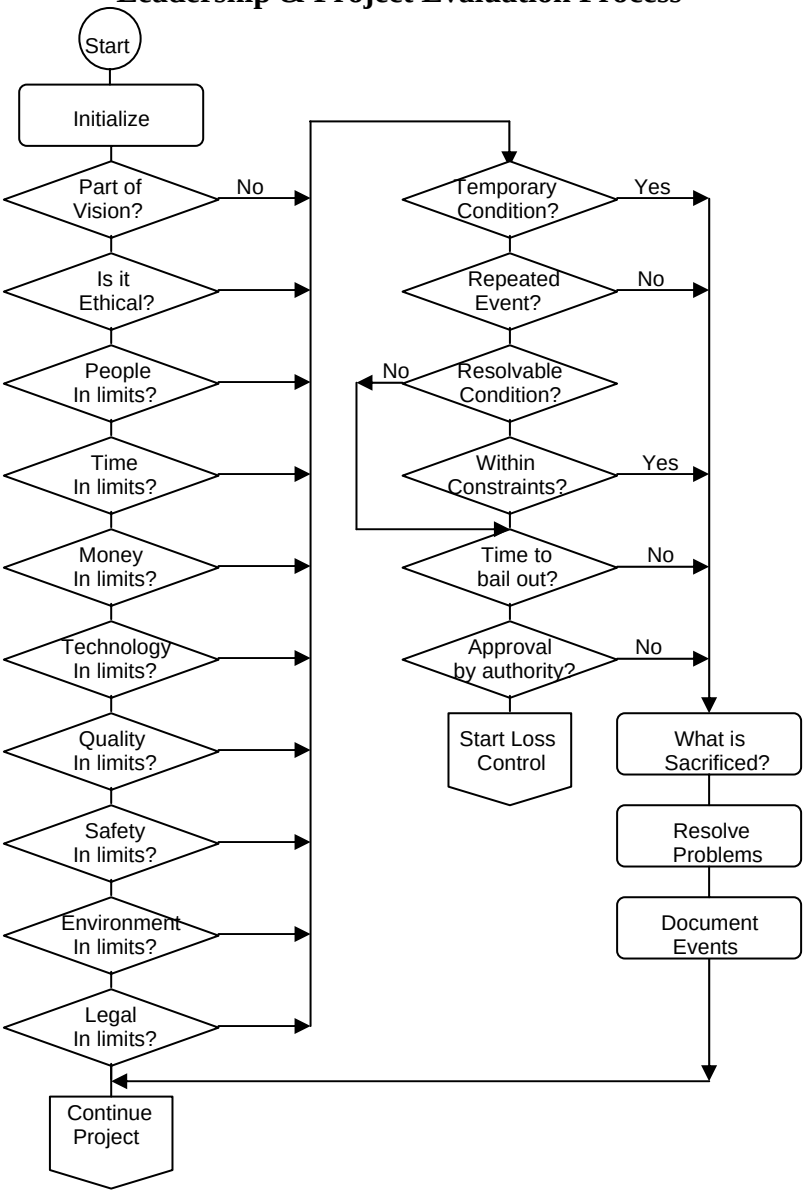
A project is an extensive undertaking of multiple tasks for a definite purpose for a set time. To determine the status of a project, it is necessary to determine all of the issues involved. As we observed in the beginning chapter, these are not ideals. They are the principles that define leadership.

The following flowchart is a good monitoring tool that should be evaluated on a regular basis. It has been developed from extensive experience in conflict resolutions, forensic investigation, and root cause analysis.

This flowchart gives the series of questions to ask. Some of these questions need to be answered with a probability function, rather

than a yes/no response. Nevertheless, ultimately there comes the point of a go, no-go decision. Whether an experienced leader or a novice technologist, the questions in the flowchart are the series of decisions that must be made.

Leadership & Project Evaluation Process



$$\Leftarrow \Uparrow \Rightarrow$$

End

Thought
The end or top of one phase
is simply the beginning or bottom of the next.
Valedictorian speech by K. D. Durham

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ABOUT THE AUTHORS

Thought
Confidence
The mental assurance that something is correct.
MOD

Personal - MOD _____

As a business owner and a university professor, I am often asked how did you do it? The answer is easy, with many mistakes that cost me substantial time and money. First, I tried to do it myself without a mentoring process. Second, I originally bought the traditional idea of "get a good education, get a good job, and you will make it."

There is no such thing as a good job. In the dynamic world of the information age, everything changes quickly. Therefore, it is unlikely a job will last for more than five years. The other aspect is someone will make money from any venture. It is either your boss and the business owner or you the business owner.

My first degree was as an electrical engineer. Then I went to work for a big company. The firm became one of the top twenty-five largest companies in the country. The company does not exist today. You are the only sure thing that relates to you.

While there, I had the dream of working a few years. Then I would start a small electrical construction company and teach at a junior

college. That idea was fine-tuned to where I am now an international consultant and teach at a prestigious university.

While working, I went back to graduate school for a master's degree in technical management. Then my first business was started. Without a mentor, I thought I needed more education, so I started on a Ph.D. program. At the age of 39, with a wife and four children in private school, I quit the company and began consulting. At the same time I completed my Ph.D. program. Talk about mid-life crises.

Our income went from six digits to less than $17,000 a year. Was it worth it? You decide. The next year an old professor called and offered an adjunct professor position. In time and with persistence, that has turned into a tenured full professorship. Within three years of the plunge, we had started another business in aviation, bought an airplane, and paid cash for a new car.

We then started an internet-based enterprise and began purchasing real estate. A few years ago, we realized we needed to do a little financial planning and protection for our assets and children. While visiting with our attorney, he congratulated us on having a net worth that necessitated establishing trusts. With that bit of information, we went to dinner, then back to work.

The next milestone revelation came while driving one of our pieces of heavy equipment building a road on our property. My son and colleague simply asked, "Dad have you calculated the net worth of this property?" Enough said.

Has it all been easy? Are you kidding? Every successful entrepreneur I know has lost it all at least twice and has had to start over. We have lost it in natural resources ventures. We have had to change our businesses and seek new opportunities. We have wondered where the next dollar was coming. As you will find, reasonably intelligent persistence pays dividends.

Marcus O. Durham _____

Dr. Marcus O. Durham brings very diverse experience to his writing and lectures. He is an engineer, who owns THEWAY Corp., an international consulting practice. He is a Professor at The University of Tulsa. He is an Associate Professor at Trinity Southwest University and formerly Dean of Graduate Studies and Professor at Southwest Biblical Seminary.

He is a commercial pilot who flies his own plane, is a ham radio Extra Class operator, and has a commercial radiotelephone license. He is a registered Professional Engineer and a state licensed electrical contractor. He enjoys the family ranch and operating the heavy equipment.

Professional recognition includes Fellow of Institute of Electrical and Electronic Engineers, Diplomate of American College of Forensic Examiners, Certified Homeland Security by ACFE, and Kaufmann Medal by IEEE.

Dr. Durham is acclaimed in *Who's Who of American Teachers* (multiple editions), *National Registry of Who's Who*, *Who's Who of the Petroleum and Chemical Industry*, *Who's Who in Executives and Professionals*, *Who's Who Registry of Business Leaders*, Congressional Businessman of the Year, and Presidential Committee Medal of Honor. Honorary recognition includes Phi Kappa Phi, Tau Beta Pi, and Eta Kappa Nu.

He has published over 100 papers and articles and has authored eight books. He has developed a broad spectrum of projects for both US and international companies. He has traveled in over 22 countries and has mentoring relationships with students in 15 additional nations.

Dr. Durham received the B.S. from Louisiana Tech University, the M.E. from The University of Tulsa, and the Ph.D. from Oklahoma State University. He has other studies with numerous educational and scholarly organizations.

Robert A. Durham

Dr. Robert A Durham and his wife have two children. Dr. Durham is the Principal Engineer of D2 Tech Solutions, an engineering and technology related firm concentrating on mechanical and electrical systems and conversions He is also Chief Engineer of THEWAY Corp, an engineering, management and operations group that conducts training, develops computer systems, and provides design and failure analysis of facilities and electrical installations. He specializes in power systems, utility competition, controls, and technology integration.

Dr. Durham is registered as a Professional Engineer in four states. His work experience is broad, and encompasses all areas of the energy industry. Dr. Durham's extensive client list includes the development of a broad spectrum of forensic, electrical and facilities projects for many companies. He also is involved with the audit of market participants in competitive utility markets to ensure that these facilities are adhering to the rules of the market. He has published three books, five magazine articles and over 30 other technical papers and articles.

Dr. Durham received the B.S. in electrical engineering from The University of Tulsa, the M.E. in Technology Management from The University of Tulsa, and a PhD in Engineering Management from Kennedy Western University.

Rosemary Durham

Rosemary Durham has equally intriguing credentials. She is a life mate who has been very involved in the family businesses. She is past President of THEWAY Corp. and is a partner in the internet based Advanced Business Technology, Inc. She is the principal for FIT, First Impression Techniques, an image consulting and analysis enterprise.

She has been active in traveling to over 15 countries on business and development. She has assisted in developing numerous papers. Her insight has been immeasurable in evaluating technical presentations and reducing them to non-technical applications. She is a ham radio Tech-Plus class operator and a photographer. She enjoys the family ranch and operates the heavy equipment. She is acclaimed in the *National Registry of Who's Who.*

Her service includes founder and president of Women for Missions, teacher, and leader of children ministries.

She is the mother of four adult children. Her nurturing shows in their success. Robert is an engineer and businessman, Christopher is a veterinarian, Karen is an engineer, and Sarah majored in marketing and language.

Mrs. Durham received the AB from Ayers Business College. She has additional studies at Imperial Valley College, Tulsa Community College, Oral Roberts University, Southwest Biblical Seminary and Trinity Southwest University.

She has extensive training from The Crowning Touch Institute. Her credentials are Certified Advanced Color Analyst: Introduction, Intermediate, and Advanced Color analysis and Image analysis.

She has co-authored five books.

The authors can be contacted at the publisher.

Cover

Dr. Marcus O. Durham is an author, lecturer, researcher, scientist, entrepreneur, university professor, seminary dean, international consultant, commercial pilot, amateur radio operator, professional engineer, and forensic investigator. He has published over 100 professional papers and articles and has published eight books. He is honored as a Fellow, Institute of Electrical/Electronic Engineers IEEE; Diplomate, American College of Forensics Examiners, Certified in Homeland Security; IEEE Kaufmann Medal, numerous Who's Who, and many of other professional awards.

Dr. Robert A. Durham is an author, entrepreneur, energy consultant, project manager, corporate executive, instrument pilot, professional engineer, and forensic investigator. He has published numerous professional papers and articles, many of which have received international recognition. He has published three books.

Rosemary Durham is an author, image consultant, administrator, executive, business owner, and international traveler. She is an amateur Tech-Plus and a photographer. She is a founder of women's outreach and teacher for ladies personal development. She is honored in *Who's Who.* She is a life mate and Mom.

The authors have written several books in the technical, philosophy, and development genres.

- *Who Is This God?* Marcus O. and Rosemary Durham
- *An Intellectual's Argument About God,* Marcus O. and Rosemary Durham
- *Micro-Controllers in Systems Design*, Marcus O. Durham
- *Systems Design and the 8051*, Marcus O. Durham
- *Systems Design and the 8051*, Second Edition, Marcus O. Durham
- *Leadership & Success in Relationships & Communication*, Marcus O. Durham, Robert A. Durham, Rosemary Durham
- *Leadership & Success in Organizations, Culture, & Ethics Culture*, Marcus O. Durham, Robert A. Durham, Rosemary Durham

- *Leadership & Success in Economics, Law, & Technology*, Marcus O. Durham, Robert A. Durham, and Rosemary Durham

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