SYSTEM SAFETY MANAGEMENT

A NEW DISCIPLINE

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Credit safety engineers for a new systems theory to the complex aerospace industry. But credit also the safety managers for making their theory apply to the average industrial management activity.

A system is simply an assemblage of things and parts that go to make up a whole. Space engineers think of their complex and dangerous manufacture and manipulation of space products as a system. "All systems go" is their famous watchwork. The Defense Department has a set of general requirements for applying systems safety engineering principles to the life-cycle of weapons systems including the conceptual design, engineering, fabrication, testing, installation, checkout, operation, and disposal. (1)

This approach to optimal safety effectiveness has given the engineering side of loss prevention a "new look" that gives promise to an exciting future for the technical safety experts. The application of systems theory, however, is not limited to safety engineering and hardware. It can and does apply to any number of things, some of which are quite familiar to us. For example: a training system, a transportation system, the Federal Reserve System, the respiratory system, the solar system, the school system, and so on. THE THEORY OF SYSTEMS CAN BE APPLIED TO MANAGEMENT.

MANAGEMENT IS A SYSTEM

In a very practical sense, management itself is a system every bit as complex as any system of hardware. Organizations are man-made systems with many interrelated functional and subfunctional parts. Each is responsible to the other in the accomplishment of a common mission of the business. Each must work in harmony to accomplish mutual goals.

"The systems concept can be primarily a way of thinking about the job of managing" according to the authors of a textbook that presents management theory in a "systems" framework. (2) This concept of visualizing the system of management as a series of parts working together to contribute to a whole is very exciting for safety managers. This book along with the works of Gulick, Urwick, Blake, Likert, Drucker, McGreggor, and others is recommended reading for every safety manager desiring to adopt the systems approach to accident loss prevention.

MANAGEMENT CAN BE DEFICIENT

H. W. Heinrich, (3) a pioneer in the field of accident loss prevention, pointed out that accident events have (1) unsafe acts and/or personal factors and (2) unsafe conditions. What Heinrich did not discuss was the managerial failures or system breakdowns that are basic reasons for human errors and condition defects. These factors must be translated into broader areas of managerial responsibilities involving policies, organization, staffing, communication, coordination, decisionmaking, etc. at all levels of the corporate hierarchy. In this concept, safety managers must stop visualizing the problem only with the individual (supervisor or employee), step back, and see the problem from the systems point of view.

PERFORMANCE ERRORS CALLED "ACCIDENTS"

Accidents are only managerial excuses for operational errors that result from manager failures. This concept was introduced in 1962 by Dr. John J. Brownfain who said, "In science, if you know the cause of an event, that event is not an accident." (4) He went on to explain that "In everyday life, if we do not like the end result of this event, and at the same time want to escape personal responsibility for it, we are inclined to call it an accident."

Dr. Brownfain's observations are important in the system safety management approach to reducing operational errors called accidents. Few will disagree that causes of most accidents (events) are well documented. Thus, what safety managers are really doing for management is programming to eliminate performance failures that produce injury and property damage. Carrying this one step further, one can say that safety activities are directed more at managerial improvement than the reduction of personal suffering, although the end result does not change.

THE FUTURE OF SYSTEMS SAFETY MANAGEMENT

Systems safety management holds great promise as a new discipline for reducing

operating errors, conserving labor resources, avoiding operating costs due to mistakes, and for improving managerial techniques. The management approach to safety involves the process of business viz-a-viz the process of things. In this process we are concerned more with the interrelationships of all levels of management in relation to the prevention of loss rather than only with the line manager (supervisor).

After six years of practical application and research with the systems theory and safety management, it is my observation that:

* Improvement of a critical managerial weakness in the organizational system that contributes to operational errors can be equally as important as protecting a critical function of machinery. One cannot succeed very long without the other.
* The principle of redundancy (multiple channels of operation to reduce possibility of failure) can apply to the process of management as well as to a mechanical operation.
* Systems reliability can be as important to the excellence of management and its functional entities as to the successful engineering of hardware components.

In short, any operating error that is reported as an accident, can be examined for managerial failures as well as human errors and condition defects. The managerial deficiencies can be traced to the several management systems and, in turn, to their managerial subsystems. The isolation, quantification, and cost evaluation of these managerial concerns then become an important part of decision-making and eventual systems improvement.

MANAGEMENT MUST BE STUDIED

The successful use of the systems theory with the management of accident prevention programs as applied to corporate organizations requires the understanding by all line supervisors that most causes of accidents can be traced to staff support deficiencies. This information about causes and costs becomes a valuable management tool for self evaluation (upwards) and a means for controlling and planning with greater accuracy and efficiency.

From what has been said here, it should be fairly obvious that a safety professional who chooses the management direction of accident loss prevention must have a broad background of managerial expertise and experience beyond that of a line manager. The art of management is as important to the safety manager as the science of engineering is to the safety engineer. Some knowledge of both is an ideal situation.

Remember, in the field of management, interfunctional interest in safety begins with the establishment of common program goals between the functional systems. This simply means that the safety manager must know what the order functional manager is trying to do for the organization and then tie safety objectives to his objectives. For example, it would be extremely difficult to obtain management interest in problems concerning "falls-of-persons" from a personnel officer - or even a property officer. On the other hand, tell personnel it has a "training" deficiency that produced over 1,000 employee errors resulting in falls, or tell a property officer that design failures are causing $200,000 of waste annually, need any more be said? In each case, the managerial weakness is degrading the expected output of the system in an area of concern that cannot be corrected by the safety manager.

Others interested in loss control (error-free-performance) will show concern if that loss is presented in a way that relates to failures in their fuctional missions or to the ability to operate and manage for profit.

If you want management's attention to safety problems, then speak management's language and be sensitive to managerial concerns. Learn all you can about each function and subfunction of your business in the same way that an engineer is expected to know about machinery he deals with. This will enable you to make serious inroads to their decision-making process. ABOVE ALL--CONSTRUCT YOUR SAFETY SERVICES TO THEIR ORGANIZATIONAL NEEDS NOT JUST TO THE REQUIREMENTS OF AN INDIVIDUAL.

CONSTRUCT AN INTRA-MANAGEMENT INFORMATION SYSTEM

Control is the basic feature to the systems theory. You can solve a problem if you don't

have the facts about it. This means that a safety management information system is basic to managerial improvement through loss prevention. This communication upward through the levels of management must be responsive to managerial needs. Use a computer to collect and store accident data related to management systems. Used correctly, safety managers will not have to beg for top management support. Functional managers at all levels will seek safety support.

No system can exist without communication. The first task in establishing a report network is to develop a source document (accident report) that allows the line manager to identify systems failures. (5) He reports them, as he sees them, in a manner that can be put into a computer. The computer can be called upon to feedback data for periodic analysis in meaningful terms (English language). This analysis with supporting facts is then given to the line managers for direct action to staff managers for systems improvements.

CONCLUSION

In summary, it would be a serious mistake to think that the theory of systems and safety applies only to hardware. Engineering or technical knowhow is not the prime requisite for all safety problems. Expertise in safety management requires a basic understanding of human resource management rather than scientific understanding of machines.

To make the concept operational, safety managers must consider always the social benefits of employees--their needs, motivations, and asperations more as groups than as individuals. There is a great need for understanding of group behavior and manager relationships and the safety manager may make a real contribution to errorfree performance by the realization of this need.

"Some loss control programs are now showing refreshing signs of objectivity" says Robert LeClerg, Assistant Chief, Administrative Operations Division, National Oceanic & Atmospheric Administration, U.S. Department of Commerce, "They share responsibility for finding and identifying all accident losses. They collect causal data in usable form instead of simply keeping score. They bridge the Communications gap by addressing dollars and manhours lost instead of percentage of rates. This momentum is well timed to reinforce the new emphasis on "ZEROING-IN" on problems. But, before we pull the trigger, let's examine the target. Our purpose must be to give effective direction to the control of all accidental losses, not to play one more hand of the same tired game". (6)

REFERENCE

(1) Refer to "Systems Safety Engineering of Systems and associated Subsystems and Equipment, General Requirements for MIL-STD 882" June 6, 1966, for all departments and agencies of the Department of Defense.

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(6) LeClerg, R.E., "A Revolution and How to Treat It", FOCUS - Journal of the National Safety Management Society - Environmental Control & SAFETY MANAGEMENT, A.M. Best Co., March 1971 p. 37