PROBLEMS OF THE MANAGER IN PHOTOGRAMMETRIC OPERATIONS

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Biographical Sketch

Sanjib K. Ghosh obtained his education and professional experience in India, The Netherlands, and the U.S.A. At The Ohio State University departments of Geodetic Science and Civil Engineering, his teaching and research interests are in the general area of photogrammetry. He has published 70 technical papers and research reports and two books. Currently chairman of ISP Working Group VI-5, he is also the Director, Digital Processing and Photogrammetric Applications Division of the American Society of Photogrammetry.

Abstract

The manager and his roles are defined. It is observed that the manager has to function with technical, time, and cost related constraints. In order to function successfully, he has to be proficient in four disciplines, viz., Engineering, Economics, Law, and Communications. Management in photogrammetric operations is generally complex because of intermittent type of productions. The advantages and disadvantages of intermittent production organizations are listed. Some well established recommendations are listed.

Resumé

Le directeur et ses rôles sont définis. Il est à noter que le directeur doit agir sous les contraintes de technique de temps et de frais. Afin d'agir avec succès il doit être compétent dans les quatre disciplines suivantes: l'ingénierie, l'économie, le droit et les communications. La gestion dans les opérations photogrammétriques est généralement complexe en raison des productions de type intermittent. Les avantages et les inconvénients des organisations de productions intermittents sont répertoriés. Quelques recommandations bien établies sont répertoriées.

Zusammenfassung

Der Leiter und seine Rollen werden difiniert. Es wird bemerkt dass der Leiter unter technischen, zeitlichen und von Kosten abhängingen Bedingungen tätig sein muss. Um erfolgreich zu arbeiten muss er in vier Fächern, d.h. Ingenieurwesen Wirtschaft, Rechtskunde und Verständigung tüchtig sein. Die Leitung bei photogrammetrischen Verfahren ist gewöhnlich kompliciert wegen absatzweiser Herstellung. Die Vor- und Nachteile absatzweiser Herstellungsorganisationen werden aufgezählt. Einige eprobte Empfelungen werden aufgezählt.

Who or What is the Manager?

The quality of the work produced by an organization depends on its team of workers which includes laborers, craftsmen, technicians, engineers, secretaries, etc. as well as the supervisors and managers. A supervisor is an individual who leads and conducts the business of his subordinates with no administrative responsibilities. A manager is one who directs the supervisor or other managers. Generally, however, the terms, supervisor and manager, in photogrammetric operations are used more or less interchangeably. He is usually a highly skilled person involved in professional management. He is someone who directs one or more workers towards accomplishing the goals of the organization.

Unlike the hardware or software of production, a manager/supervisor is not readily available from a warehouse or a desk. He does not come catalogued and cannot be programmed. Neither can he be obtained via a purchase order, nor can a mathematical model obtain the best out of him. On the other hand, a manager is directly involved in hardwares, softwares, warehouses, desks, purchase orders, mathematical models, and some more things as well.

How Does the Manager Function?

In a competitive and challenging technical field, the decisions and influences of the manager can determine whether the organization will succeed in its objectives. The nature of the organization and the working circumstances may determine the specifics. Yet, there are certain problems common to all photogrammetric managers. In this presentation, an attempt will be made to look into those common problems.

It is assumed that we understand the broad scope of the manager's responsibilities, viz., he not only renders sound technical (Engineering) decisions but also is familiar with and sensitive to the non-technical issues they will confront. The three basic objectives, with the associated constraints for which the manager is responsible are:

1. Deliver a product that meets the requirements of the technical specifications. (Technical Constraint).

2. Deliver a product that meets the requirements of the delivery schedule (by plan within a Governmental organization or by contract within a Private organization). (Time Constraint).

3. Meet the organization's fiscal objectives (budgetary limitations or profit objectives as the case may be). (Cost Constraint).

The manager has the dominant role in establishing or influencing these objectives because he is responsible for the production, delivery, and accounting operations. There are certain prerequisites that will have to be satisfied if the objectives (within associated constraints) are to be achieved. These are as follows:

A. The organization must have the particular technical resources (Material, Equipment , Hardware/Software, and human resources) required for meeting the specification objectives.

B. The organization must have adequate facilities (both material and human) and fiscal and other resources to meet the delivery schedule.

C. The terms of the fiscal objectives, rates, etc. should be realistic and adequate to cover the performance of the organization.

The achievement of the basic objectives requires that the manager be proficient in disciplines which cover all of his (managerial and engineering) functions. The foremost amongst these are:

i) Engineering: By its nature, a project oriented task covers several areas of engineering. The manager cannot be expected to be an expert in each of the other technical areas. However, he must be familiar enough with the basics of all of those areas to be able to consider alternatives and to be able to evaluate procedures. He has to make correct decisions involving complex scheduling problems also, sometimes involving the sponsor.

ii) Economics: In most cases, particularly in the areas of industrial applications, all the various aspects can be ultimately reduced to one common factor -- money. Thus, cost management is one most important function of the manager. Cost-effectiveness is his final goal in this respect.

iii) Law (or Rules and Regulations) : Most projects involve a contract (can be of various types) between two or more parties. In the public organizations, the contract is in the form of commitments and obligations. In all these, however, the implications of legal and contractual terms must be fully understood in order to fulfill the contractual obligations. The employer's obligations to not only the sponsor of the project but also to the employees who carry out such obligations become ultimately the manager's responsibility.

iv) Communication : In various projects, there are great requirements and expectations in negotiation psychology, tactics, procedure and standards of communication conduct. The manager often must be even aware of when or what to say or what not to say.

It may be mentioned here that the first one (viz., Engineering) is necessary for technical decisions, the second one (viz., Economics) is necessary for monetary and commercial decisions, while the last two (viz., Law and Communication) are necessary for administrative decisions. All of them interact in a complex manner and uniquely in each different case.

Management in Photogrammetry

The role of the manager in photogrammetry is somewhat complex yet typical. The standard topographical mapping with aerial photographs is, by now, an established affair with governmental agencies in practically all countries. Such standard topographic applications are somewhat continuous operations and somewhat adequately planned (at least through experience) within these agencies. Yet, amongst them and beyond, the production pattern is invariably intermittent, which makes it more complex and challenging for the manager.

Some important characteristics of an intermittent production organization, which are not considered as very advantageous are:

1. Products are in large varieties and in relatively small quantities;
2. Similar equipment are grouped together, where no product is made but a part of the total process is executed;
3. The work loads are unbalanced;
4. Skills of the workers are higher in order to cope with the short runs of production of new or varying jobs;
5. Supervisory intensity has to be higher;
6. The inventory of the material has to be carefully made to ensure ready availability of standard materials (e.g., particular type of emulsion, particular size of plates, etc.);
7. In-process inventory is high -- to cope with the need for the waiting period required for varying jobs;
8. Material handling incidences and costs are higher; and
9. Automation could cause economic woes unless the basic system could be applicable to varying jobs.

These would cause high unit cost of production in terms of "per man-hour" or "per machine-hour". In such cases an accurate forecasting of customer (or sponsor's) demands may be impossible in most cases.

On the other hand, there are several advantages in intermittent productions:

1. There is a flexibility at the volume of consumption. The sponsor usually understands the problem and often adjusts to the realities;

2. The capital investment is relatively low, which means that the manager's skill in Economics need not be of very high order, although because of the variety of jobs, more technically educated management is required;

3. The variety of jobs forces removal of stagnation of skills, and the workers are generally prepared for different jobs or change of jobs at very short notice.

These offer challenges to use modern technology of management for balancing and optimizing of the jobs in view of efficiency.

The majority of organizations (both private and public) involved in photogrammetry may be considered "small", i.e. with 250 or less number of employees. In these, the talented managers can usually command considerable benefits and job satisfactions.

Conclusion

Finally, some recommendations for scientific approaches in photogrammetric managements can be presented here (after Taylor, 1910):

1. The manager should use the scientific rather than the rule-of-thumb approach. This will give him a consistent and reliable approach and will prove to be the best in the long run;

2. Harmonious work and production is obtained by assigning appropriate man-instrument-technique combination to each set of operation;

3. The manager should be encouraged to choose the best means of economic production with quality;

4. Worker specialization needs to be obtained with the aim of increasing efficiency in production; and

5. The manager must strive for and encourage others towards enterprise and even individual prosperity.

The photogrammetric manager must be aware of his responsibilities to the public in the framework of science and technology. The cost-effectiveness aspect is foremost in this. There is an air of optimism, however,-- most of the managers seem to be progressive and have proved to be on the right track.

Bibliography

1. Ghosh, S.K.: Economic Aspects in Special Applications of Photogrammetry; Invited Paper, ISP Com. VI ; Helsinki, 1976.

2. Klein, L.R.: An Introduction to Econometrics; Prentice-Hall, N.J.; 1962.

3. Seiler, K. : Introduction to Systems Cost Effectiveness; Wiley-Interscience; 1969.

4. Taylor, F.W.: Principles of Scientific Management ; Harper and Bros., New York ; 1910.