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## CHAPTER 8

### INFORMATION AND COMMUNICATION NEEDS OF STRUCTURAL ENGINEERING RESEARCHERS

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#### ABSTRACT

Information system forms an integral organ of scientific research. proper and timely communication to its users is needed at each step. Users are supreme and so their actual needs are to be identified to design the appropriate and essential information services to yield the research results faster. Structural engineering research follow the pattern of scientific research and the needs of the users can be assessed studying their step wise research activities.

#### INTRODUCTION

Most of the research programmes are showing slow or sometimes negligible progress though the organisations, institutes, universities or individuals try to equip themselves with latest tools and techniques. Saving the overall rational human slackness aside, the top management and policy planners must give a serious thinking to identify the reasons of such inordinate delay in research programmes. Among various reasons of inadequacy like expertise, observatory, laboratory, latest equipments and tools for experimental or analytical activities scientific information communication forms the base of all research activities at all steps and

levels. Lack of proper communication of relevant information is the root cause of inordinate delays in majority of the cases.

### INFORMATION : A RESOURCE

Each incremental advancement in scientific research is a product of existing knowledge and the validated research results added. This cycle goes on keeping the known facts as foundation or base to bring the unknown to light. The known facts also need refining, modification, testing on larger population and sometimes it totally refutes the existing knowledge. This forms a chain of progressive research. The dynamic nature of science and technology and the fast changing socio-economic, and political gamut of the society gave rise to multidimensional and exponential growth in scientific information.

### CHARACTERISTICS OF SCIENTIFIC INFORMATION

In the light of Five Laws of Library and Information Science this can be interpreted as :

1. Existing information is for use and it provides the base for further research. It adds to, replaces or sometimes refutes it. It can not be accumulated for long as it gets obsolete very soon and so it requires timely use.
2. Information is for all. It is universal in nature. It is equally useful to all scientific community crossing the barriers of political, social or economical groups.
3. Information is amenable to repackaging suiting to cross the barriers of language, level of understanding - education or technical training and availability of reading time. It can also change its physical form keeping the contents same.
4. It is meant for users. Use of primary sources of information must be ensured in the least possible time providing them secondary and tertiary documents.
5. It is evergrowing and so places a challenge to keep the growth manageable. Collecting only the relevant, serving the fresh and weeding out the obsolete without reservations.

## Structural Engineer at Research Desk

Basically a structural engineer/scientist/research worker shares the responsibility of providing improved technology of analysis and design of complex structures and their components in order that these may be strong enough to withstand the natural loads or extra normal forces encountered on them. To find out the better, dependable, efficient and optimum results, evaluation/revision of the existing methods, theories, laws, principles, practices, procedures, etc. are put for further study. The research worker has also to find new dimensions, alternatives at lower costs without sacrificing the fundamental requirements, comforts, aesthetics, life, etc.

## Information Seeking Behaviour of Structural Scientists

Scientists engaged in research approach to find their queries through various sources. To know what is being done in the same or similar projects elsewhere or what has already been done on a particular topic or field. This is essential to avoid unnecessary duplication of efforts, economising the expenditures, facing the situation of bottlenecks, interruption or failure, stimulating ideas, for shaping new research projects, etc. Such general queries form the current approach or is termed as short range reference service but expects the users to interact regularly to keep themselves aware of the latest developments.

Some times : Scientists need specific information for specific situations. These may be categorised in three types :

1. Every day : Where quick answer is sought like data, table, graphical or mechanical interpretation, practice or standard specification, formulae, etc. This need comes in short range and such queries are put several times a day.
2. Exhaustive : Such queries need exhaustive search, selection and preparation of related packages to be used for making decisions for wider coverage or deep study and so takes considerably more time and is covered in long range.
3. Catching up : Scientists usually not very frequently but occasionally wish to know in brief the overall picture of a topic, the trend of developments and also those areas in which he may not be an expert but needs its application.

Information needs : The information requirements of a user can easily be identified analysing the activities in which information is to be used. These activities can be detailed as under :

#### A. Taking up a New Research Project

1. Study of social, economic, professional and national priorities in terms of proposed topic for research, needs information like plan projections, five year plans, Govt. policies, announced from time to time, industrial and economic reviews, reports, feasibility and study reports, social and professional calls, etc.
2. Survey of identical projects : on going, completed or to be started by others in industry, academic or research organisations to avoid unnecessary duplication or to ensure the depth/coverage/point of view not being on and the same or to be sure to improve the methodology or results or to remove the lapses of the existing/on going projects. this requires the information like research in progress, project reports for completed or abandoned projects, future plans, etc.
3. Defining scope, limitations, methodology, expected results is essential before framing a formal proposal for taking up a new project.
4. Justifying the project budget as research is a costly affair with hardly any quantification in terms of outcome and input. to justify the financial involvement programmed Budgeting System is used supported by the statements of its social importance, industrial prospects or national development or import substitution or export potentialities. This needs information on the procedure of putting the factual data in programmed budgeting system as well as conventional budget. Though this work could be entrusted to planning section, yet the project leader must also know to guide the planning for a proper implementation. Knowledge of import and export potentialities of techniques, procedures, etc. is to be gathered from various sources like : survey reports, foreign trade directories, etc.
5. The statement along with its budget; manpower, equip-

ment requirement, etc. are put before a coordinating authority for approval to start a new research project with the defined objectives and expected outcome. On approval; it is notified through normal channels like plan projects to let other concerned know in order to not to repeat the same or similar projects of the same intensity/extensity.

## B. On Going Projects

An approved project travels through several phases like :

1. Literature search
2. Preparation of a reading list of the relevant reference collected through the retrospective search with/without annotations.
3. Determination of core periodicals, special publications of learned societies, organisations, institutions, etc. and other primary publications like seminar proceedings, lecture notes, specifications, patents, thesis and so on.
4. Determination of secondary sources to satisfy the current, day to day, catching up and exhaustive approaches demanding the documentation lists, current awareness service, SDI, bibliographies, abstracts or indexes, state of the art, reviews, trend reports, directories, guides, handbooks, manuals, monographs, encyclopaedias, etc.
5. Determination of theoretical and experimental techniques and choice among the existing alternatives.
6. Literature collection, study, assimilation, discussion with team members, identification of bottlenecks, providing solution at the spot to various barriers.
7. Formulating hypothesis based on the pilot studies, collecting further data based on intensive studies.
8. Testing the hypothesis using the comprehensive results, experiments at large scale before the outcome is established and made public.

## Projects at Completion Stage

1. Preparation of draft reports, articles to be sent for publi-

cation in periodicals/in seminars/inreview/abstracting/indexing journals.

2. In house discussion, presentation, colloquia, etc. over the manuscript.
3. Editing, styling, referencing and formatising as per specific prescriptions and instructions to contributors for publication.
4. Revision, addition, deletion, correction, desired by the editor.
5. Proof reading of galley proof of the paper and approval for final printing.
6. Reply to discussions over the paper after publication.
7. Arranging the technology transfer process, patenting the process, organising training programmes, preparation of course, display and publicity material to get the application of the useful research to all levels of users.

### **Library and Information Services**

Each and every bit of research activity from idea plane to action and implementation, publication, training the end users, the information system remains as a partner. Library as a central point of information access system plans its activities in such a manner that the whole course of action takes a very little time to serve the users.

### **Behind the Screen**

1. Survey, collection and analysis of data regarding users needs, information seeking behaviour and dependence on the library.
2. Collection development proces - acquisition
3. Organisation - classification and cataloguing
4. Storage and maintenance - shelf arrangement, rectification, physical verification, repairs, weeding out, etc.
5. Statistical data - generation of data of various types of activities - readership, circulation, etc.
6. Financial data - preparation, control, utilisation of budget properly and timely.

7. System evaluation and improvement mechanism - performance tests from time to time under users satisfaction and improvement with the latest techniques as and when and where ever needed. Interaction with the users : Library, documentation and information services invite fruitful interaction between the planners, executors and the users of these services. These services can be grouped in two broad categories - on demand or responsive and anticipatory.

#### Why anticipatory and why not responsive :

A very few users can identify what exactly they want or need in a particular situation unless they actually see and recognise the relevant out of many. this phenomenon is gathering mass recognition in all activities of life and has given way for ready made varieties of products. Information science products should be designed, prepared and marketed anticipating the demands. however for a particular demand a responsive service is always welcome and tailored.

Information Communication as per approaches :

#### 1. Current Awareness/Alerting/alarming :

To keep the scientific/research workers abreast of the latest publications in the field in general and for the common interest these services are useful and provided for. these include - Title announcement of latest publications in journals, reports and other proto type publications. 2. Research in progress, short communication, etc. 3. News brief. 4. Notifications for forthcoming seminars, courses, meetings lectures, etc. 5. Specific information matching specific project profiles (SDI) covering the current publications.

#### 2. Condensates :

To facilitate the choice of relevance on the basis of contents in brief to overcome the barrier of abundance and location through - 1. Abstracting; informative or indicative abstracting services. 2. Extracts. 3. Technical digests. 4. Index with or without annotations. 5. Bibliographies 6. Catalogues.

#### 3. Repackaging :

Technical notes prepared on the basis of advance theories,

methods, etc. for the sake of various groups and also for the common man. These include handbooks, directories, course material, data service, etc.

#### 4. Reference :

The users personalised guidance and help in the matter of tracing out or identification of a reference in a library or information system. These need readers guidance, ready reference, retrospective searches and referral services.

#### 5. Evaluation :

The users are provided a state of the art of the subject with latest developments and contemporary views through - trend report, state of the art report, reviews, etc.

#### 6. Reprographic :

To overcome the barrier of physical access due to various reasons, reprographic services like xerox, microreproductions help.

#### 7. Allied services :

Translation - to overcome the barrier of mutiplicity of languages. Publication - to provide help in editing, styling, formatising the references, etc, proof correction, filing a patent, bringing out a report, etc.

#### 8. Liaison :

To get the institutes research widely applied, marketed or transfered for use, various steps are necessary like - training the entrepreneurs or their technocrats, providing the links between the users and the scientists for active interaction, management of consultancy or advisory services, etc. conclusion : Information services to structural engineers engaged in advance research must conform to the actual needs of the activities they perform in day to day and in long term projects. It reduces the span of their search, provides better choice and speeds up the research work.

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