

110

INF. SYS

Advances in Lib. & Inf. Sc.  
Vol. 4, 1993; pp. 21-30.

## CHAPTER 2

### COMMUNICATIONS AMONG STRUCTURAL ENGINEERS

R.C. GUPTA

---

#### ABSTRACT

Shelter is among the three basic requirements of human being. The land needs to be utilised vertically in place of horizontally. The academicians, researchers, contractors, practitioners, architects and planners, manufacturers of structural elements, suppliers and consultants look towards the structural Engineering Institute for solving the space problem and meeting out the increasing pressure of population. Audio-visual resources occupies an important place in providing such information to its end users. The paper also discusses the barriers in Information communication.

#### INTRODUCTION

Continuous research brings unknown facts to light and demands application to open the fronts for progress for a comfortable human life. Communication among experts ensures speedy and flawless results. It can be in the form of oral or recorded documents. Human and institutional sources of information are referred for an expert advice and immediate decision with personal interaction discussing pros and cons. The documentary sources of information are the normal channels and are available crossing the barriers of time, space, language, physical access, etc. if provided

with proper information services.

The desire to communicate is the pervasive fact of social life. In a very fundamental sense, communication is culture and culture is communication. The public buildings, the arts, rhetoric, and the sociodramas of civic life have all served to communicate the cultural heritage and to engender a common understanding among a group of people. Communication is always purpose oriented. There must be at least two factors- communicator (sender, transmitter, speaker, author, or alike) and the communicatee (receiver, listener, audience, user or so). The former must have gathered the requisite communicable information through constant thinking, distillation, experiments, study or otherwise learnt. He/she must be eager to communicate and ready to transform it to the level of understanding of the latter. The latter should also be eager to know, acquire, listen, observe or watch the information being flown. The level of understanding and the media of communication, i.e. language must bear the equivalence to the former.

Shelter is one of the three basic needs of human life. Under the pressure of tremendous growth of population, the problem of providing food, clothes and homes is becoming critical and complex day after day. Precious fertile land has to be utilised for cultivation to produce enough food and yarn. The land cannot be increased with the increase of population pressure. Besides homes, industrialisation, sports, communication and transportation systems also need ground space. The environmental essentialities do not permit to cut short the forests and greeneries to make more space available for all these buildings. Hence the need of utilising vertical space in place of horizontal for constructing necessary building became compulsory.

### STRUCTURAL ENGINEERING : A DISCIPLINE

The study of the art and science of determining the dimensions, sizes, shapes, and strength of structures and their components in order that they may be strong enough to withstand the loads imposed upon them. It has received the recognition as an engineering discipline of advance study, research and practice to provide strong, economical and attractive structures to residential, agricultural, industrial, recreational, communicational buildings for solving the problem of space and meeting out the increasing pressure of population.

Users of Structural Engineers Services are :

**A. Academic :**

1. Teaching faculty includes professor, reader, lecturer, instructor, demonstrator, helper, etc.
2. Students cover Researchers, Post Graduate, Graduate, Diploma, Certificate, apprentice, etc.

**B. Research :**

1. Director, Project Leader, Manager, etc.
2. Scientist, Assistant, Technician, Helper, etc.

**C. Contractors:**

1. Public
2. Private

**D. Practitioners :**

1. Engineers
2. Assistants
3. Supervisors
4. Skilled labour
5. Unskilled labour

**E. Architects & Planners :**

1. Designers
2. Surveyors
3. Draftsmen
4. Tracer
5. Others

**F. Manufacturers of Structural Elements:**

1. Metal, Steel, Aluminium, etc.
2. Timber
3. Cement, Concrete
4. Brick
5. Composite

**G. Suppliers**

#### H. Consultants :

1. Individual
2. Organisation

#### I. Users or Consumers:

### INFORMATION GENERATION AND COMMUNICATION

Different users need different information in their different activities. These activities, besides, learning and teaching basic theories, fundamentals, etc. or applied research project finding new methodologies of analysis and design can be categorised as :

1. Study and assessment of the problem posed and line of action needed.
2. Study of the architectural plans, elevation designs and drawings.
3. Study of the estimates, costs, materials proposed for use, ratio suggested.
4. Structural designs and drawings
5. Soil and foundation studies
6. Analysis of loads - live and dead on each point
7. Selection of analysis techniques
8. Use of analysis tool- computer
9. Development of computer software
10. Execution, experimentation, etc.
11. Preparation, compilation and publication of results
12. Exploring marketability or application possibilities
13. Liaison service

### COMMUNICATION CHANNEL

On each step of decision taking situation only accurate information has to be applied. Scientists or research workers or site engineers need specific expertise all the time of their work. Information thus needed can be obtained by them through any of the communication channels. A large number of formal and informal communication channels have been evolved to satisfy the various information needs of the scientists and structural engineers. These can be categorised as:

## 1. Audio

11. Face to face (confined to one & the same place)  
Lecture, speech, conference, conversation or discussion, interview, exhibition, display, etc.
12. Recorded tapes, records, etc.
13. Telelink system: Radio, signals, telephone, etc.
14. Microwave link: satellite

## 2. Visual

21. Mass communication through local exhibitions, display
22. recorded documents for television
23. recorded documents for reading
24. recorded documents for use through computer and other mechanical systems
25. Communication through postal system.

## SOURCES OF INFORMATION COMMUNICATION

The following can be considered as the vita source of information communication:

### Human Sources

Interpersonal communication is probably the most important and effective information source for speedy consultation, advice and decision making. Experts can be available within the organisation itself or outside it. Communication may be face to face or through any other system because of its being at a distant place.

Communication Links among individuals :

- Academic – Faculty members to students  
 Faculty members to Faculty members  
 Students to Faculty members  
 Students to students
- Research – Director to Project leaders  
 Project leaders to Director  
 Project leader to Project leader  
 Project leader to Scientific workers  
 Scientific worker to Scientific worker

### Institutional Sources

Institutions and learned societies engaged in imparting ad-

vance education, carrying advance research in engineering, providing advisory or consultancy services, executing constructional projects, etc. generate valuable information under corporate authorship. As a team work of the institution it is published for use within or outside the organisation. The organisations usually render consultancy services on demand.

### Documentary Sources

Formal communication includes the written, printed, published or recorded information to be used by reading. It can be grouped in the following three categories:

- (i) Primary Documents
  - (ii) Secondary Documents, and
  - (iii) Tertiary Documents
- (i) Primary Documents : These include - short communication in journals, Research in progress bulletins, special publications, news letters. Papers in journals containing research methodology, bottlenecks, remedies and final results, seminars and conference proceedings, special publications, serials, periodicals, thesis, lecture notes, course material, or the documents basically communicate scientific research.
- (ii) Secondary Documents : These include Indexing and abstracting services, reviews of progress, reference books, (encyclopaedias, handbooks, dictionaries, tables, formularies, treatises, monograph, textbooks, etc.
- (iii) Tertiary Documents : Information about the primary or secondary sources like list of periodicals, yearbook, directories, bibliographies, location lists, catalogues, list of abstracting and indexing services, guides, list of publications, etc.

### BARRIERS IN INFORMATION COMMUNICATION SERVICES

The ultimate goal of a information unit is to make available the generated information to its users. But practically it has to pass through a number of hurdles in reaching to its potential user. The information system has evolved certain mechanisms to overcome these barriers and ensure the smooth information flow for timely use before it goes obsolete.

## Space

Points of generation of information and users of information are usually located a distance apart. The information is recorded on paper, tape, micro forms, computer readable data bases, etc. and is made available through transmission, postal, telecommunication or micro wave links in primary, secondary or tertiary sources.

## Abundance

The scientific and technological literature is being brought out in millions and poses the problem of choice and proper selection for use. This becomes more complex when it goes on accumulating day by day. Communication of such information is ensured through secondary sources like abstracting and indexing, documentation lists, SDI services enabling a user to ascertain the suitability of a record to his/her work. A relevant record thus selected can be procured for use.

## Obsolescence

Advancing research has led the generation of information in abundance replacing the earlier documents declaring most of them as old, stale or obsolete. It calls for a timely communication before it is declared so, the inadequate time available for study all such relevant documents, assimilation the information contents and its timely use is simply not possible by an individual. Condensate services like reviews, state of the art, trend reports, digests, analysis and evaluation type services can be of great help to have an overall view of the current research in the field and proper choice of the relevant reference therefrom.

## Interdisciplinary Research

The present trend of research and study is interdisciplinary. Structural Engineers have to apply mathematics, statistics, management science, behavioural science, architecture, physics and so on besides their structural engineering. This poses the problem of scatter and seepage of literature in various sources of information and it is very difficult to know these. Indexing services covering a wide range of subjects can easily interlink such references and facilitate the effective communication.

## Language

Communication can be effective if the signals of the sender are understood by the receiver. These signals form a language. There are a number of languages but the user can not be familiar with all such languages and so also the communicators are not restricted to use only one or a few languages to record their messages. Here comes the translation services for rescue.

## Standard and Mode of Presentation

The level of understanding the message play a vital role in communication. It is usually not of the same standard of presentation as to the receiver/user. The success of the application of the end results of a research in majority of the cases depends upon the bench workers. To communicate to them, the standard and mode of presentation has to be transformed comensurate with their understanding. Repackaging services solves this problem.

## Reliability

Information generated and placed for use is not always complete, correct or authentic. It may need further tests, experiments and improvement before it is applied or it may cause heavy set backs. Standards, specifications, patents, etc, help in these areas but these are issued quite late and do not cover the whole spectrum. Information analysis data service, evaluation, current research, etc. can be made use of in these cases.

## Unpublished Information

Neerly 50% information remains unprinted, unpublished for wider circulation. Thesis, research reports, progress reports, conference proceedings are generally brought out in low quantity. These are very important sources of information on specific topics and form base for further and continuing research and can not be ignored. Physical access can be ensured in these cases through reprographic services.

## Space

Growing accumulation needs more and more floor area to shelve properly. The area requirements can not be increased boundlessly. Either the existing should go to give room to the new



additions or the addition process should be stopped. Both the situations are fatal for information communication. To keep a balance and for an effective communication, obsolete items should be weeded out regularly and current should be added preferably in micro form.

### Funds

Information communication faces the biggest barrier when the abundance of relevant documents, computer charge, micro link payments, etc. demands huge investments. The budget allocations always get affected and cuts are applied first to this head of expenditure. Authorities convincingly but deliberately divert the resources to some other projects. In such a situation, resource sharing phenomenon definitely helps to keep the communication process running.

### CONCLUSION

Information communication is a regular process among the experts of some of similar disciplines in their work and study. There are a few hurdles in the way of formal and informal communication but these could be easily overcome by applying appropriate information services and utilising Resource Sharing Phenomenon.

### ACKNOWLEDGEMENT

The paper is sent with the kind permission of the Director, SERC, Roorkee, for publication.

### REFERENCES

- Goffman (W.). General theory of communication. In Saracevic, T ed. : *Introduction to Information Science*, N.Y. Bowker, 1970 : 720-47.
- Guha (B.). *Documentation and Information*. Calcutta, World Press, 1978 : 19-20.
- Gupta (R.C.) and Jayaraman (N.). Planning an information system for building technology in India. *Annals of Library Science and Documentation* 26 : 1979 : 26-32.
- Gupta (R.C.), Jayaraman (N.) and Krishan Lal. Information Activities in Building Industry. *DRTC Annual Seminar on Industrial Information System and Services*, Bangalore, December 1979, 4D : 1-14.
- Jackson (D.). Structure of the literature and channels of communication. In

- Mildren (K W), ed. : *Use of Engineering Literature*, London, Butterworths, 1976 : 1-3.
- Neelameghan (A), comp. *Refresher Seminar on Information Service for Business and Industry*. Bangalore, D R T C, 1974 : 5 : 1.
- Penland (P B). Communication Science. In *Encyclopaedia of Library and Information Science*, 5 : 421-65.
- Price (D J De S). Collaboration in an Invisible College (In Saracevic, T, ed. *Introduction of Information Science*, N.Y., Bowker, 1970 : 101-7.