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Abstract: This report outlines major barriers to good communication through literature search and experiences. The impact of the following sample of factors is discussed: words and language, message size, non-verbal clues, poor listening, lack of feedback, time constraints, apathy, bad news syndromes, and pace of innovation.

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**BARRIERS TO EFFECTIVE
COMMUNICATION**

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BARRIERS TO EFFECTIVE COMMUNICATION

PRESENTATION SUMMARY EAS 541

"TEAM 5"

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I. PROBLEM STATEMENT

- A. Communication, one of the most important aspects of a companies success is often given the least amount of attention.
- B. A lack of proper communication can envelope a company slowly without being detected until the entire system is showing signs of failure.

II. COMMUNICATION BARRIERS

- A. Communication process
 - 1. words, language, lack of feedback....
- B. Sender/Receiver
 - 1. perceptions, expectations, emotions....
- C. Organization and Environment
 - 1. structure and climate, geography....

III. QUESTIONNAIRE SURVEY AND ANALYSIS

- A. Barriers ranked, compared, and evaluated

IV. COMMUNICATION ANSWERS, IDEAS AND SOLUTIONS

- A. Recommended solutions

V. METHODS OF DATA GATHERING

- A. Literature search (manual and computer), books, questionnaire, and work experience

ABSTRACT:

Good communication is a basic skill that allows a company to prosper. Without efficient communication, a company might fail. Many barriers to communication impede the proper flow of information. This paper outlines the major barriers of good communication. Through literature searches and experiences, a multitude of barriers are defined and discussed. The following barriers are included: words and language, message size, non-verbal clues, poor listening, lack of feedback, perceptions, expectations, emotions, personalities, difference in status, geography, serialization, structure and climate, competition for attention, knowledge/power struggles, resistance to change, insufficient methods, time constraints, apathy, bad news syndromes, and innovation pace. Surveys on communication were investigated and two types of studies are reviewed. An additional study was completed to investigate communication barriers, specifically. In the additional study, local engineering personnel, from primarily manufacturing and support group environments, were asked to select the most significant barriers, based on personal experience. These responses are tabulated and presented. Finally, ideas and solutions to communication barriers are presented and discussed.

INTRODUCTION:

Communication, one of the most important aspects of a company's success, is often given the least amount of attention. How can this be so? Why would a company fail to see the duplication of effort, the ignorance of like operations, and the lack of synergy? Are they blind? In a way, yes, they have become blind. A lack of proper communication can envelope a company slowly, without being detected, until the entire system is giving off signs of failure. Morale will be low, people are quitting, profits are falling, and things simply do not work as quickly and efficiently as they used to.

We recognized that in our respective work places, one of the biggest problems we encounter is that we do not know what other groups in our companies are doing and what resources they might have. The following paragraph is a short example of this.

A group is working on a million dollar project. Part of the work involves designing and testing a very efficient widget. The project leader decides that three engineers will be assigned to this project on a full time basis. These engineers are supported by five technicians and all the required equipment and facilities. Everything about this situation looks reasonable and justifiable, but it is neither. Another

group that is within the company, even within the same building complex, has already perfected a very efficient widget. It has been designed, tested, and built over a year ago. Time, money, and energy have been needlessly wasted by the duplication of efforts caused by the lack of proper communication.

Our team decided to find the major barriers that hinder effective information transfer. Since all people communicate in some fashion, the barriers and solutions presented are applicable to a vast number of situations. The literature research consisted of books, magazines, and an on-line search. A questionnaire was then developed to poll the pertinent barriers that were uncovered in the research. Using the research and the questionnaire, we have outlined the major barriers and ways of correcting them.

COMMUNICATION BARRIERS:

Information: misunderstood, misinterpreted, misread, mistaken,... missed. Why? Because within the communication process there are a number of barriers which impede the flow of information. These communication roadblocks include any factor which may interfere with or distract from the effective transfer of information.

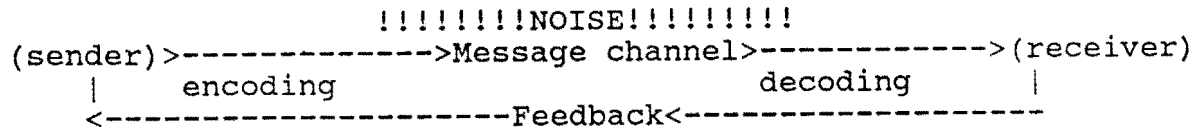
Through a literature survey, we have compiled a list of the most commonly perceived barriers to communication. We have grouped these barriers as follows:

BARRIER SOURCES	BARRIERS
Communication Process	words and language message size non-verbal clues poor listening lack of feedback
Sender/Receiver	perceptions expectations emotions personalities differences in status
Organization and Environment	geography serialization management and climate competition for attention

While these barriers are all interrelated, this grouping is a useful tool for understanding what they are and how they occur.

COMMUNICATION PROCESS:

This first class of communication barriers involves the communication process itself, which, in its simplest form, can be modeled as follows:



When any aspect of this process is missing or interfered with there is a good chance one's message will not be understood as intended.

Words and Language:

Many feel that the greatest barrier to communication is the lack of common language. This is especially true in technical organizations where the words and symbols used by the technical personnel differ immensely from those belonging to nontechnical groups.

Even meanings, in the simplest messages, can be misconstrued because of the vagueness of certain words. For example, not being able to overcome the problem of friction in an engineering project will mean one thing to a mechanical engineer and quite another to a personnel director.

Message Size:

In other instances the message is too long or complex for understanding or repetition. As Poirer explains, "As soon as the communication exceeds the level of a simple affirmation or negation of a question, the sender of the message must be aware of the limitations of the process."(6)

Ignoring Non-Verbal Clues:

A message channel that is often given to misinterpretation is in the area of non-verbal communication. Facial expressions, body posture, and clothing are all non-verbal clues which tell others something about ourselves. Sometimes the non-verbal messages we send do not match what we are really saying or thinking. You may roll up your shirt sleeves in anticipation of tackling a big project. While you're feeling industrious, your boss's boss may see you as sloppily dressed. In many instances non-verbal clues will mean different things to different people depending on their cultural background, experiences and even gender.

While the barriers listed above related to the encoding process, the next two are primarily associated with the receiver and decoding activity.

Poor Listening:

A widely recognized barrier is poor listening. Our listening skills are generally not on par with our message sending abilities even though we spend an estimated 60% of our time listening. Speaking occurs at the rate of 140 words per minute, but we can assimilate approximately 500 words per minute. As Sigband and Bell say "It is no wonder, therefore, that a listener's mind tends to wander as it moves further and further ahead of the speaker."(11)

Lack of Feedback:

Lack of feedback occurs when the receiver does not give the sender any clues that he is receiving and understanding the message. This is sometimes referred to as unilateral communication. Without getting any response from the receiver, the sender does not know whether or not he needs to modify his message so that it is better understood.

SENDER/RECEIVER:

A.B. Linde described communication problems as "human problems."(7) In other words, it is the communicator himself that is the main factor in ineffective communication. The attitudes, personal characteristics, and experiences we carry around with us affect how we send and receive information. Effective communication requires that we modulate our feelings and attitudes, so that our message is more accessible to the receiver. For the most part, we are successful in this. Occasionally though, communications are framed too much in terms of our own perceptions.

Perceptions:

Given the same message, we all have the potential to interpret that message differently. This is because our understanding of it will be based on our cultural background, education, and previous experiences. In many cases, perceptions of a given piece of information may be so divergent that the communicating parties have trouble finding enough common ground to even begin interrelating.

Expectations:

Like perceptions, expectations are based mainly on previous experiences, but, unlike perceptions, expectations are preconceived. As it is often said, "We hear what we expect to hear;" even though the actual message may be different.

Expectations left to sit too long can become prejudices. Prejudices involve unreasonable beliefs in certain ideas. The classic example is where the supervisor states, "Well, I've been here 30 years; we never tried it before, and I'm sure it won't work now." Individual's biases against one's ideas can be one of the most frustrating barriers one meets up with.

Emotions:

A heightened emotional state can distort our understanding of a situation or message. As Conrad explains, "When we are insecure, worried, or fearful, what we hear and see seems more threatening than when we are secure and at peace with the world." (3)

Personalities:

Personality conflicts may cause us to dismiss a message unjustly or in the extreme case, refuse to communicate with certain people. On the other hand, we will communicate better and more frequently with people we like.

Differences in Status:

Differences in hierarchical and or social standing can impede communications in a number of ways. Superiors are free to call on subordinates at any time, whereas the subordinate does not have this same freedom. Information received from a subordinate may not be given the same weight as information from above regardless of its importance. An example of this involves a biomedical technician friend of mine; despite his thorough knowledge and experience in his field, his instructions regarding the care and use of certain medical equipment are frequently ignored by the doctors and operating room personnel, because he is only a technician.

ORGANIZATION AND ENVIRONMENT:

This group of barriers is made up of certain external forces which develop from organizational size, climate, and management personalities and practices.

Geography:

In larger companies communications can be strained because of the physical distance separating communicating parties. Telecommunications have helped make decentralization possible. Nevertheless, while it may be "the next best thing to being there," it is a common experience that communication via telephone is often lacking. Without the advantage of the non-verbal clues included in face-to-face communications, meaning is not always clear.

Serialization:

Another barrier in large companies involves the serialization of messages. When a message has to travel thru a number of people to get where its going it may be delayed or distorted.

Organizational Management and Climate:

A rigidly enforced chain of command may slow information flow if communications are confined along lines of authority. In a company that is poorly organized and without a formal communication network, messages may never reach the intended receiver.

The cultural ambiance of an organization can have a profound affect on communications. If the cultural climate is one of fear and suspicion, due to ongoing power struggles, information will be closely guarded and frequently unreliable. Without common goals and objectives, groups within an organization (eg. R and D and Marketing) can find lots of good reasons not to talk to each other. In short, good communication begins with upper management. If this is not a priority then information flow throughout the organization will be hindered.

Competition for Attention:

In busy offices there are many distractions which can minimize our attention span. Background noises often detract from messages we are trying to send or receive. In other instances we are victims of information overload. In giving ourselves faster and increased means of communicating we have exceeded our capacity to assimilate. We can become "...perceptually selective; we hear and do not listen; we see and do not assimilate."(11) The result is that we have the time and capability to respond to just a fraction of the input directed towards us.

Most of the barriers we have described here have no specific remedies. Others may not be in any one individual's power to correct. Nevertheless, there are a number of guidelines which can be followed in order to achieve improved communication. These are described in the section "Communication Answers, Ideas, and Solutions.

COMMUNICATIONS SURVEYS:

Communication surveys have taken many forms. Two main survey types, from the literature searches, were selected as being significant examples of the types of studies completed on the communication processes. These surveys were: "...Unilateral vs. Bilateral Communication" (1) and "Communication Networks in Business..." (2). These surveys will be reviewed, briefly, to illustrate the information gained by existing surveys. Unfortunately, the above surveys did not pertain directly to the topic of communication barriers. Therefore, a short study was completed to assess communication barriers, specifically. The results were compiled and related to the findings of the literature.

Unilateral and Bilateral Communication (1):

William V. Haney, from the School of Business at Northwestern University, conducted a study of unilateral (one way) versus bilateral (two way) communication. The study analyzed the efficiencies and limitations of these two forms of communications. In the study nearly 400 persons were required to participate in both unilateral and bilateral communication exercises. The respondents were then required to answer a series of questions to relate the communication process. The questions pertained to how the respondent felt about the type of communication process and how confident they were in their interpretation of the message.

Attachment I, from Harvey's study, effectively illustrates the results. Of the 398 participants, over 90 percent felt that the unilateral communication was frustrating in nature. Parts II and III, of Attachment I., show the efficiency of these two types of communication. Unilateral and bilateral communication differ greatly with a correct message being understood 4 to 5 times more often when bilateral communication is used. Bilateral communication, as one would expect, yielded far superior results.

Communications Networks (2):

A. K. Wicksburg, of the University of Minnesota, conducted a study of the communication patterns of 91 business men in the Twin Cities area. The study pursued questions such as: What were the reasons for communications; In what direction does the communication flow; who were the members in the communication network? The participants were categorized into either manager or nonmanager roles. The accumulation of the data was accomplished through the use of daily log books kept by the participants.

The reasons for communications were categorized into 5 areas: information, instruction, problem solving, scuttlebutt, and approval. The study revealed that just over 50 percent of the communications were initiated for the purpose of information. Just over 20 percent were completed for an instruction purpose. Problem-solving accounted for 11-12 percent of the communications. Scuttlebutt and approval trailed with percentages less than 10 percent. See Attachment II, Table 1.

The direction of communication was categorized into the areas of horizontal, vertical (in the normal hierarchical organizational structure), and diagonal (defined as communication outside of the participants normal hierarchical channels). Clear standouts in the data were not found. The author cited a interesting note that the diagonal communication comprised around one third of the communications thru the analysis . See Attachment II, Table 2. Along with this portion of the study, an analysis of the difference between managers and nonmanagers was completed. Comparisons of communications for the same level and one level above the participant showed that there was no difference, to the .05 confidence level, between managers and nonmanagers.

The members of the communication networks were analyzed in two forms: first, by organizational unit and, second, by direction of communication. Attachment II, Table 4 shows the results of this by organizational unit. The managers seem to be very balanced in there communications within and outside their departments and divisions. The nonmanagers appear to communicate preferentially with people outside their department but within their division. Attachment II, Table 5, shows the direction of communication. This illustrates that the communication is not primarily in the traditional hierarchical structure, but rather with associates communicating diagonally up or down and horizontally in the organization.

Communications Barriers Analysis:

Through an informal study, multiple communication barriers were compared , ranked and collated. Administration of the study was completed by Team 5, of EAS 541, as part of Portland State Universty's Engineering Management program, during the fall of 1987. The study was very limited in scope and targeted communications barriers rather than communications methods or channels. Attachment III. is an example of the questionnaire used for the study.

Part one of the questionnaire addressed the source of the data. The questionnaire asked what the general job title was for the respondent. The job titles were in the categories of individual contributors and management. The individual

contributor category was further broken down into areas of operator, technician, or engineer. The managerial category was broken into areas of supervisor, manager, and executive. See Attachment IV for a graphical representation of the job titles of those participating in the study. Job environment was assessed in a similar manner as job titles. Types of organizations were listed as choices. The respondent was asked to select the type of organization that best described his or her job environment. The organizations listed were: research, development, manufacturing, quality control, marketing, sales, support group, and personnel. See Attachment V. for an illustration of the job environments of the respondents. For further background into the interaction of the individuals studied, each was asked to identify how many people he or she communicated with in the course of a 'typical' day. The histogram in Attachment VI. shows the results of this question. General conclusions of the job titles, environments and activities of the respondents can be drawn. In general, our survey consisted of managerial personnel in manufacturing or support group organizations. The activity of these personnel, in communication with others, was fairly consistent within the group. The 11-20 bracket was the most frequently selected.

Communications barriers were analyzed by listing many known barriers and requesting the respondent to select the five largest barriers to communication. Also available were open blanks to allow the participants to add any categories they felt were required. The data from all of the questionnaires was then tabulated and ranked. Attachment VII. presents this data in histogram form. An interesting outcome of the data shows that most people feel that the nonphysical barriers, such as power struggles, resistance to change, and personality conflicts, are the largest barriers to communications. These three barriers were three of the top four barriers. These most selected barriers would fit well within the category of "Sender/Receiver" barriers as described above.

Due to the limited sample size, an attempt to statistically quantify the results was not made. Only qualitative generalizations were made. Further studies will be required to statistically quantify the findings.

*you are
not
making
any attempt
at analyzing
and
interpreting
the
survey
results*

COMMUNICATION ANSWERS, IDEAS, SOLUTIONS:

This section will begin with a general discussion on the importance of communication, and follow up with a list of recommended solutions to resolve, in general, communication barriers.

Ideas:

There is no single solution, no final answer no absolute theory which improves communication/information transfer. A.W. Lindh of EBS Management Consultants Inc. states "It seemed as if there were almost as many theories on communications as communications experts."

Communication is the way we affect or inform each other, not how information transfer is achieved. The how is an easy one to solve depending on the different modes you choose for the desired purpose (i.e. written and electronic communication, verbal or body language, or graphic communication).

For every need to communicate, a mode of communication can be found. It's not only a question of which modality (medium) to use but a more fundamental question of how to turn the receivers attention in the desired way in order to affect and/or inform. A. W. Lindh states that the "canned approach to communications, inherent in many how-to programs, often ignores the fact that communicating is a changing, highly personal activity with roots deep in each individual's personality--and not just a mechanical process of words in and words out." (7) Also Earl Planty and William Machaver from Johnson and Johnson feel that "In a sense, communication is synonymous with human relations, since most personal relationships are carried on through some form of communication, verbal or other." (9)

It seems, therefore, that you can lead a horse to water but he must be interested in drinking the water. Or the carrot and the stick idea must be used, as Edwin Timbers, Associate Professor of Business at the University of Santa Clara states:

"...before collective bargaining became commonplace, employers were often prone to use the stick and did so with relative impunity...since fear has lost much of its potency in American industry as a primary motivator, management has no choice but to use the (carrot and) the employees desire for good." (9)

Individual two way communication can be as difficult as group, department or organization communication. It's necessary to understand why communication is necessary, how one benefits from sending and how the receiver can benefit from receiving. There are personnel benefits as well as corporate benefits. Lynn A. Townsend President of Chrysler Corporation states that:

"There is a particular need for every manager to understand that good communication is a way to achieve corporate objectives: it's a way to build better teamwork: it's a way to make money--not just a way to spend it."(9)

Chrysler has developed an corporate communication policy centered around human nature as the primary direction in which the most benefits can be achieved. Chrysler states:

"The corporation recognizes that employee attitudes and resulting performances are improved when employees are well informed about the affairs of their company and how such company matters affect them as individuals... It is desirable that a policy be established to guide managers in establishing throughout the corporation, the climate and the channels necessary to maintain a consistent, two-way flow of effective communication--communication which will not depend on varying interpretations by managers of its desirability--or on other extraneous factors..."(9)

Another advocate of communication as related to corporate benefits is Milton J. Wiksell associate professor of Communications at the University of Wisconsin/Milwaukee. He states that "...where communication is lacking, frustration and misunderstanding exist, and this condition not only reduces their productivity but also has an adverse effect on corporate profits."(9)

Communication satisfies the personnel need to understand, to be recognized, and to be valued as an individual having self worth (people problems). Communication is also vital to any type of organization. Marlene L. Rossman, in her article Bridging the Communications gap between Marketing and Operations, says that:

"The ability to communicate product benefits and marketing information to various divisions in a corporation and to the consumer can make the difference between a successful product or service and a failure. To be effective, these training programs must be industry and company-specific. however, the basic goal remains the same, which is to provide the most time and cost efficient way to open

channels of communications between marketing and operations."(10)

Communication usually just doesn't happen and the bottom line is that if someone or some organization wants communication they must work for it. Communication must be in the corporate climate, atmosphere, and basic training policies. To be effective it must be a top down driven philosophy.

Harold P. Zelko in his article An Outline of the Role of Listening in Communication. states that "...more and more attention is being given to the part that listening plays in the total communication process." He also states that "Listening is a major part of the communication process." We spend about 45% of our communication time listening, 30% speaking, 16% reading, and 9% writing."(9) This is not to say that the value of the listening content is greater than speaking, reading and writing content but if one can get a good grasp on what people listen for, the probability of communication success will be greater. An anonymous author states that the following:

"It is worth remembering that people listen when they are motivated to hear. As many staff experts have discovered, fellow managers actually tend to hear the good ideas that the expert has only when the manager has a problem for which the idea might provide a solution."(9)

Do not try and bridge the communication gap by communication only what you feel is important. Take some extra effort and try to understand how the receiver can be reached, and what sparks his interest.

You can measure your success by the quality of feedback. Silvester Stallone, famed in the movie "Rocky...." has said that in order to be successful in anything you must do ten percent more than what is required of you. Think about this when you are trying to communicate.

Recommended Solutions:

1. Internal communication must be recognized as an essential tool of good management.
2. Employees must be well informed concerning their mutual interests in company success.
3. The corporation should try to persuade employees to take actions which will best serve the long-range mutual interests of themselves and the company.

4. Managers must actively support the corporate communications effort.
5. Put a greater emphasis on communication planning and measurement.
6. Top management must establish a good communication climate.
7. A long-term investment in professional talent and communication programming must be made.
8. Management must recognize its responsibility to listen as well as to speak.
9. Managers must recognize the desire of employees to help their company, and the power of communication to tap this potential.
10. Get a good grasp on what good communication really is.
11. Don't rely on the canned approach for training good communication. Explore alternatives.
12. Don't get hung up on paperwork and the mechanisms of communication. focus on what is real to the employee or receiver.
13. Take a good look at how to generate motivation that leads to higher moral, higher productivity and other intangible goals that are vital to the success of the company.
14. Recognize the existence of emotions as a driving force of communication.
15. Revitalize honesty, sincerity and trust.
16. The CEO must develop a climate that is open to multideminsional communication flows.
17. Involvement seems to be a key factor in information retaining information. Get people involved!
18. Learn by doing not by analysis paralysis
19. Discuss problems immediately and keep the discussions frank and open.
20. Choose the proper mode and place to communicate.
21. Be fair and equitable, develop good attitudes.

22. At the managerial level train yourself in the art of communication. (i.e. suggest rather than dominate, clarify situations with illustrations and visual aids, ask appropriate questions as problems are explained, listen carefully, recognize workers who do well, deal fairly with all employees, give reasons for policy changes, are people as well as company oriented)
23. Develop upward as well as downward communication channels
24. Reduce the physical distance between superior and subordinate
25. Keep in simple
26. Don't resist becoming involved with the personal problems of subordinates.
28. Act on information brought to your attention don't let it stagnate.
29. Beware of emotions and prejudices
30. Be alert to non-verbal signals
31. Don't state the position or proposals first. Let the receiver have first crack at it.
32. Develop a common language on a common level.
33. Try to eliminate the vagueness of certain words.
34. Plan to use as your advantage the best possible chosen medium.
35. develop trust between the parties involved. Without trust chances are that the communication will be wasted.
36. Insist that a feedback loop be included in all vital messages.
37. Develop emotional security.
38. Value your subordinates judgement
39. When the communication revolves around change make sure that the employees have a hand in contributing to the change.
40. Develop an attitude of being people centered verses production centered.

41. In order to enhance upward communication play down your status and position. This will help thaw out those latent creative ideas in your subordinates.
42. Try to develop common points of view with the receiver.
43. More communication is not necessarily better, eliminate unnecessary noise and concentrate on the content of the message.
44. Communicate face to face, or eyeball to eyeball
45. Communicate succinctly when possible but remember everything is not black and white, good or bad, either or. Be thoughtful of the receiver. communicate enough so that the receiver does not jump to conclusions.
46. Make sure that the non verbal communication supports the communication message.
47. It is rare that the receiver finds the same meaning as you communicated. Be careful about word connotations.
48. Don't be all inclusive. Don't use words like ALL, NONE ALWAYS, NEVER, EVERYBODY, AND NOBODY. Using all encompassing may negatively group everyone together. This is usually not the case.

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ATTACHMENT I.

TABLE 1 Results

<i>N</i> = 398	<i>Unilateral</i>	<i>Bilateral</i>
I. Frustrated	$\frac{360}{398}$ or 90.3%	Does not pertain
II. Correct . . .	$\frac{55}{398}$ or 13.8%	$\frac{330}{398}$ or 82.9%
A. But <i>Not</i> reasonably confident of accurately interpreting.	$\frac{21}{55}$ or 38.2%	$\frac{65}{330}$ or 19.7%
B. And reasonably confident of accurately interpreting.	$\frac{34}{55}$ or 61.8%	$\frac{265}{330}$ or 80.3%
III. Incorrect . . .	$\frac{343}{398}$ or 86.2%	$\frac{68}{398}$ or 17.1%
A. But reasonably confident of accurately interpreting.	$\frac{82}{343}$ or 23.9%	$\frac{21}{68}$ or 30.9%
B. And <i>Not</i> reasonably confident of accurately interpreting.	$\frac{261}{343}$ or 76.1%	$\frac{47}{68}$ or 69.1%
IV. Total of those reasonably confident of accurately interpreting.	$\frac{116}{398}$ or 29.1%	$\frac{286}{398}$ or 71.9%
V. Time		
A. Actual	Mean: 6.1 minutes	Mean: 14.7 minutes
B. Estimated	Mean: 9.8 minutes	Mean: 15.0 minutes

ATTACHMENT II.

TABLE 1 Communications Frequency Classified by Purpose and Position

<i>Purpose</i>	<i>Position</i>	<i>Per cent of Total Com- munications</i>	<i>Frequency Level</i>
Information	Manager	53.5	Level I
	Nonmanager	54.2	
Instruction	Manager	22.4	Level II
	Nonmanager	21.3	
Problem-solving	Manager	11.1	Level III
	Nonmanager	12.5	
Scuttlebutt	Manager	6.6	Level IV
	Nonmanager	8.2	
Approval	Manager	6.2	
	Nonmanager	3.8	

TABLE 2 Direction of Communications Flow as Per Cent of Total Entries for Each Purpose and for All Communications

<i>Direction</i>	<i>Informa- tion</i>	<i>Instruc- tion</i>	<i>Approval</i>	<i>Problem- solving</i>	<i>Scuttle- butt</i>	<i>All Communi- cations</i>
Horizontal:						
Manager	31.0	25.1	21.5	33.3	43.1	30.2
Nonmanager	41.3	43.7	33.4	45.6	67.9	44.7
Vertical:						
Manager	29.7	38.7	42.2	31.3	23.5	32.8
Nonmanager	22.8	23.2	34.5	22.8	19.1	23.1
Diagonal:						
Manager	39.4	36.1	35.8	35.4	33.3	36.9
Nonmanager	35.9	33.0	32.2	31.5	13.1	31.7

ATTACHMENT II (cont.).

TABLE 4 Number of Members in Average Individual Network
(by organization unit)

	<i>Within own unit</i>	<i>Outside unit, in own dept.</i>	<i>Outside dept., in own div.</i>	<i>Outside div., in own firm</i>	<i>Outside firm</i>	<i>Total net members</i>
Manager	7	9	9	9	2	36
Nonmanager	4	6	10	6	2	28

TABLE 5 Number of Members in Average Individual Network
(by direction of communication)

	<i>Vertical up</i>	<i>Vertical down</i>	<i>Diagonal up</i>	<i>Diagonal down</i>	<i>Horizontal</i>	<i>Total</i>
Manager	2	5	5	10	14 ^a	36
Nonmanager	2	—	10	—	16 ^b	28

^a in own unit — 1; outside unit — 13.^b in own unit — 2; outside unit — 14.

ATTACHMENT III.

TECHNICAL COMMUNICATIONS QUESTIONNAIRE

The following questionnaire is part of a team project to be completed for EAS 541 of Portland State University's Engineering Management program. The team members are:

Kerry Spurgin
Scott Anderson

Kris Winckler
Matt Hoskins

Please complete the questionnaire and return to one of the above by 11/25/87. Thank You for Your Support.

1. Select the most appropriate for your job title.

<input type="checkbox"/> Operator	<input type="checkbox"/> Supervisor
<input type="checkbox"/> Technician	<input type="checkbox"/> Manager
<input type="checkbox"/> Engineer	<input type="checkbox"/> Executive

2. Select the best description for your job environment.

<input type="checkbox"/> Research	<input type="checkbox"/> Marketing
<input type="checkbox"/> Development	<input type="checkbox"/> Sales
<input type="checkbox"/> Manufacturing	<input type="checkbox"/> Support Group
<input type="checkbox"/> Quality Control	<input type="checkbox"/> Personnel

3. Approximately, how many people do you communicate with each day?

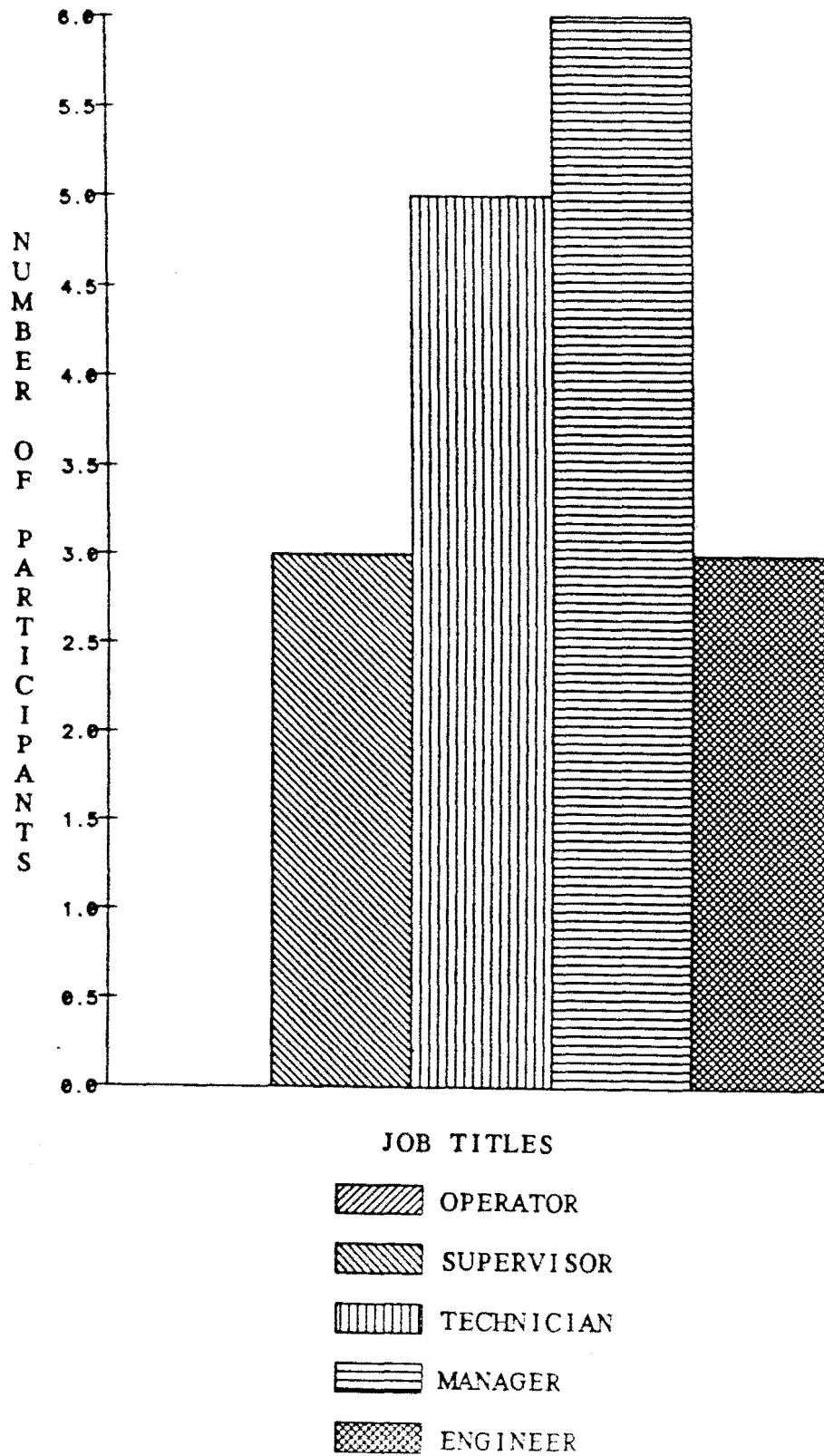
4. Please select the top FIVE reasons for ineffective information transfer:

☐ Knowledge/Power Struggles
☐ Innovation Pace
☐ Apathy
☐ No direct Benefit
☐ Time Constraints
☐ Insufficient Methods
☐ Serial Communication Methods
☐ Resistance To Change
☐ Bad News Syndrome
☐ Geographic Barriers
☐ Locating or Retrieving
☐ Language Barriers
☐ Personality Conflicts
☐ Central Vs. De-central Organizations.

☐ Other _____
☐ Other _____
☐ Other _____
☐ Other _____
☐ Other _____

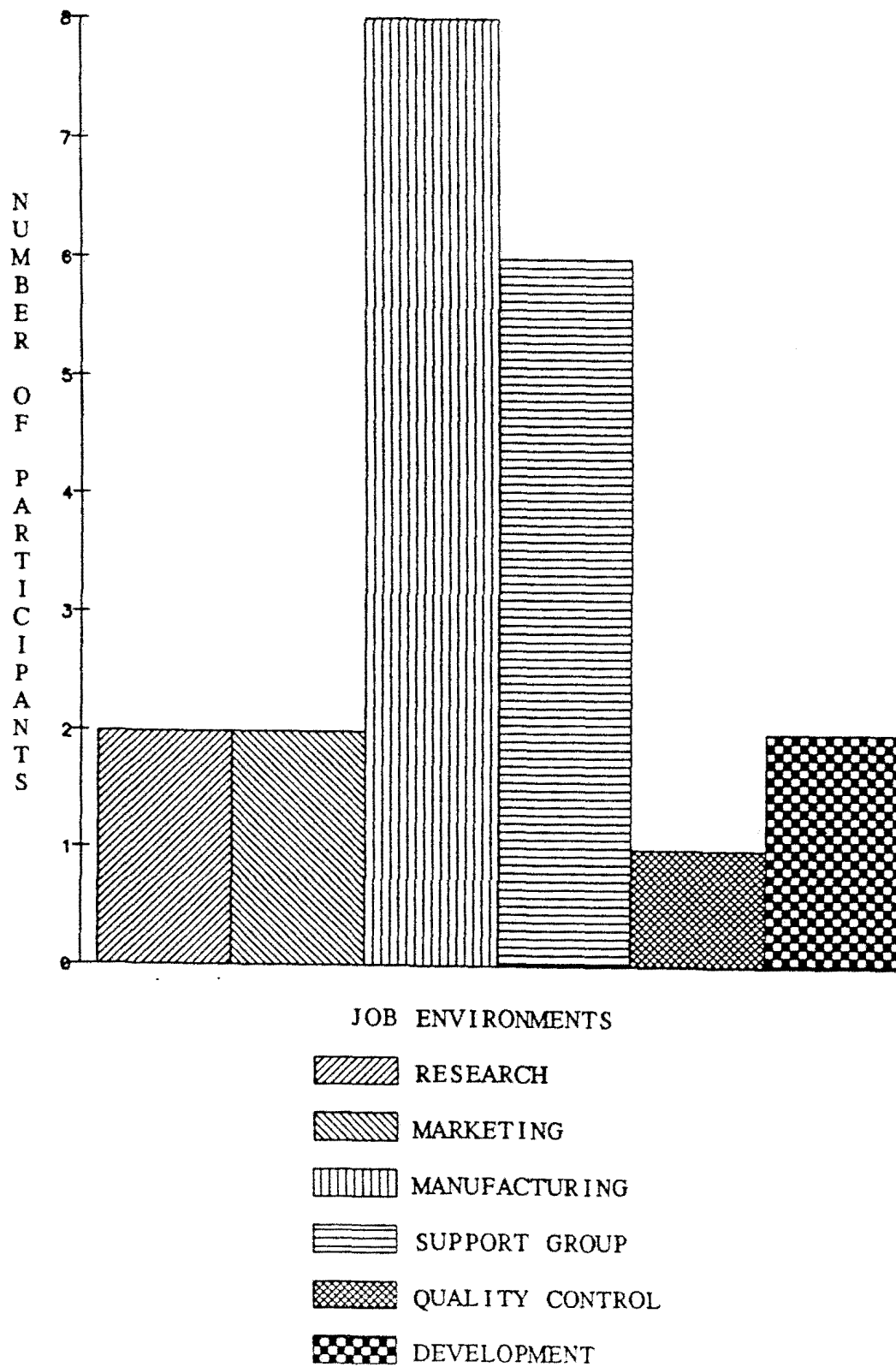
ATTACHMENT IV.

DISTRIBUTION OF JOB TITLES



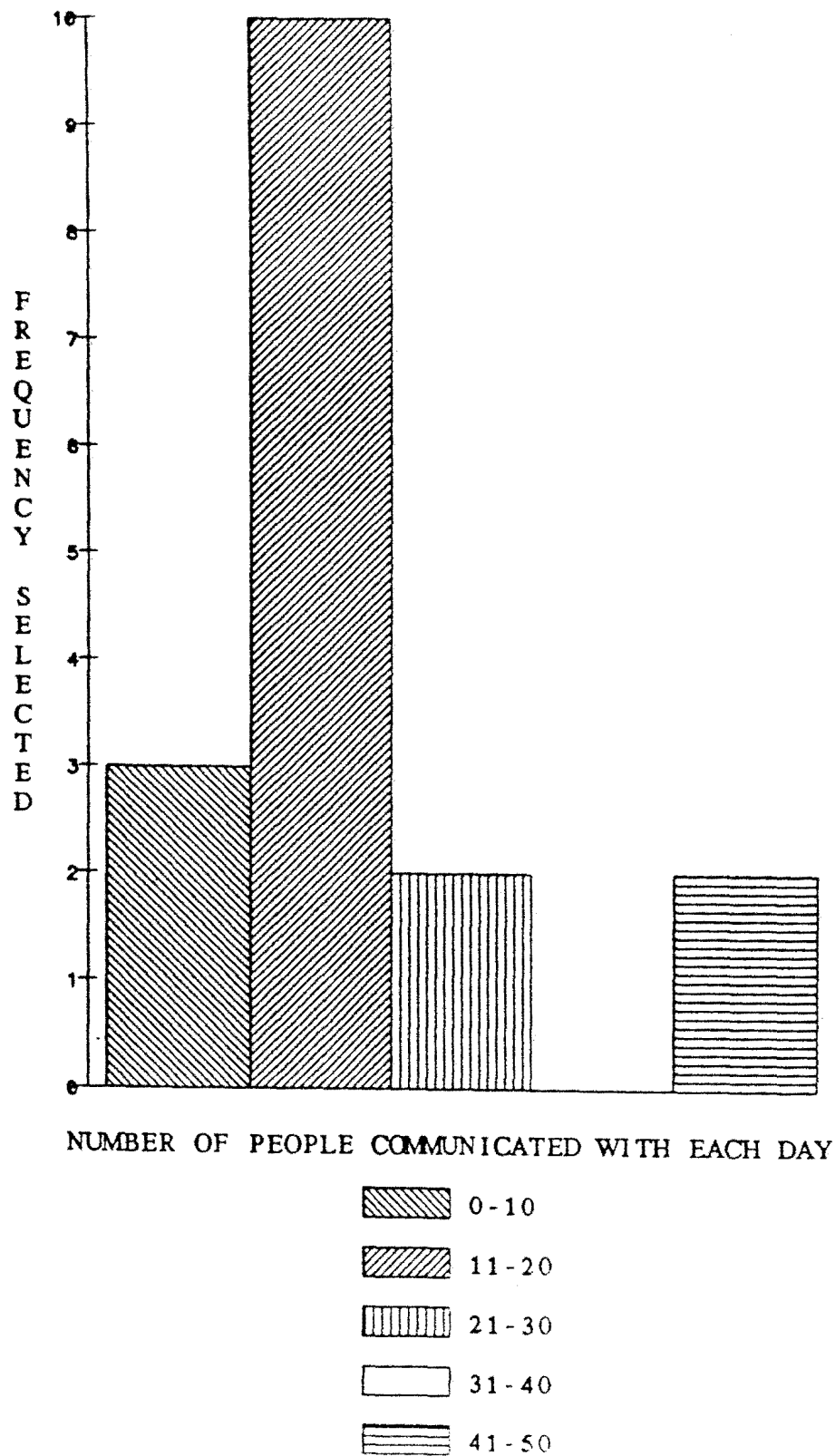
ATTACHMENT V.

DISTRIBUTION OF JOB ENVIRONMENTS



ATTACHMENT VI.

FREQUENCY OF COMMUNICATION



ATTACHMENT VII.

COMMUNICATION BARRIERS

