

**Productivity, Supervision and Morale
Among Railroad Workers**

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Foreword

In April 1947 the Office of Naval Research granted a contract to the Survey Research Center to start work on "A Program of Research on the Fundamental Problems of Organizing Human Behavior." The original proposal stated that "the general objective of this research program will be to discover the underlying principles applicable to the problems of organizing and managing human activity. A second important objective of the project will be to discover how to train persons to understand and skillfully use these principles." The research has been devoted to discovering principles which contribute both to the productivity of the group and to the satisfaction that the group members derive from their participation.

After preliminary planning, the first study in this program was undertaken in the summer of 1947 in the home office of the Prudential Insurance Company in Newark, New Jersey. A report presenting the findings of this first study was published by the University of Michigan in December 1950 under the title: "Productivity, Supervision and Morale in an Office Situation — Part I."

The present report describes the results of the second of the series of studies that are underway. Other reports will follow during the next few years.

The initial support of the Office of Naval Research made it possible to start this program. The continued support of the ONR has enabled the Survey Research Center to pursue and extend this research into other companies and organizations. During this period, the foresight and understanding of Drs. J. W. Macmillan and Howard E. Page, and Rear-Admirals Thorvald A. Solberg and Calvin M. Bolster were of crucial importance. Industrial concerns are recognizing the value of this research and are giving it increasing support. As this support grows, the research will be extended, in accordance with the original plan, into a wide variety of business organizations, into other governmental agencies, the armed forces, additional labor unions, and social welfare and voluntary organizations.

The results being obtained thus far and partially reported here suggest that many of the principles of organization and management widely held and widely applied at present are based on theories

of human motivation that are not valid. This implies that as principles based on more valid theories of human motivation are substituted for those being currently used there will result increases in productivity and group satisfaction. Should this prove true, the investment made by the Office of Naval Research in starting this research will be repaid many times.

*Rensis Likert, Director,
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Acknowledgments

The authors must share with many others the credit for whatever merit there is in this study of railroad workers. They have drawn from many sources assistance in planning and executing the study and in analyzing and reporting the results.

The study was made possible by the interest and cooperation of the management and employees of the Chesapeake and Ohio Railroad and of its Pere Marquette District. Cooperation came from every level in the supervisory line and from the rank and file workers who, together with their foremen, freely furnished the basic data for the study. The authors would like to give personal thanks to Charles R. Hook, Jr., William E. Kendall and Vernon C. Michelson of the C. & O. and to Brent Baxter, formerly of the C. & O.

Credit for the universal acceptance of the study among the railroad employees belongs largely to the Chesapeake and Ohio System Federation of the Brotherhood of Maintenance of Way Employees. Just before the study went into the field, a letter from F. M. Crance, General Chairman of the Brotherhood, carried to all union members an unqualified endorsement of the study.

The field work on this project was conducted in northern Michigan from late autumn into mid-winter along the lonely stretches of track on which maintenance of way employees work. To the interviewers, to Field Supervisor Lyons Howland, and to Charles Cannell, head of the Survey Research Center's Field Office, goes credit for skillful interviewing in a difficult field situation.

The authors wish to acknowledge the assistance of the Survey Research Center Coding Staff, supervised by Nancy Johnson, and of the University of Michigan Tabulating Services, supervised by Kurt Benjamin. They are also indebted to both Dr. Knut Pipping, who worked on the study as a visiting fellow from Finland, and to Arthur Floor, for valuable contributions to the analysis.

Selma K. Engel assisted in the final editing of this report and in preparing the manuscript for the printer.

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The Authors

Summary of Findings

This research in human relations on the Chesapeake and Ohio Railroad is concerned with the question of productivity and some of the factors which affect it. More specifically, the study examines the extent to which the level of productivity depends upon characteristics of supervision and upon those employee attitudes which constitute morale. The research findings show that the behavior of the first-level supervisor is an important factor in determining the productivity of a work group. Moreover, when we look at the various supervisory characteristics, which are associated with high productivity, they appear to be related to each other in a meaningful way. In other words, high productivity is not something which a supervisor attains accidentally, nor is it achieved by performing certain magic gestures or "human relations tricks." The successful supervisor is successful, because he has a different concept of his role and responsibilities, a different set of attitudes toward his employees, and a different approach to people and to their motivation on the job. The specific things which he does and does not do on the job should be understood as reflections of these basic differences between the high and low producing supervisors, rather than as easy means to increased production.

The high producing supervisor appears to regard the attainment of productivity as a problem in motivation and sees his role primarily as one of motivating workers to achieve a goal, of creating conditions under which the goal can be reached. He differentiates his role clearly from that of the workers themselves; he clearly perceives and accepts the responsibilities of leadership. He spends a larger proportion of his time in actual supervision. Thus, the practice of working along with the men, doing what they do, rather than concentrating on supervisory and planning activities, is typical of the low producing supervisor, while it is not typical of the high. Similarly, the supervisor who sees productivity exclusively in "machine" terms of work, flow, quotas, and standards is likely to be among the leaders of the lower producers. The high producing supervisor sees the job in terms of the employees' needs and aspirations; he is employee-oriented, but does not abdicate the leadership position. There are other findings which add to the picture of the successful super-

visor who bears a supportive relationship to the people in his work group. His men report that he takes a personal interest in them and that he behaves in an understanding, non-punitive fashion when they encounter problems on the job. They also report that their foreman is helpful in training them for better jobs.

In stressing the supervisory determinants of productivity, the results of this research corroborate many of the findings obtained in the earlier study of clerical workers.¹ Replication of the earlier findings in such a drastically different work situation builds toward a group of related, research-based generalizations about interpersonal relations in organizations and about their implications for organizational effectiveness.

¹KATZ, D., MACCOBY, N. and MORSE, NANCY. *Productivity, supervision and morale in an office situation, part I*. Survey Research Center, University of Michigan, 1950.

Chapter I

The Study Plan

Background of the Study

The railroad track that binds the nation together stretches across industrial hubs, rural areas, farm country and lonely miles of wasteland. It is the framework of the nation's railroad system and it must be constantly policed by gangs of men who perform the heavy, physical labor of maintaining specified sections of the railroad right of way. The workers and foremen of these maintenance of way section gangs are the subjects of this study of *Productivity, Supervision and Morale Among Railroad Workers*.

The study is one of a series conducted by the Survey Research Center in its program of research on human relations in group organization.¹ The locale is the Chesapeake and Ohio Railroad's Pere Marquette District which travels northward across Michigan into Canada. The objectives are:

1. to discover the relationships between supervisory attitudes and behavior, and group productivity among section gangs on a railroad;
2. to discover the relationship between productivity and worker morale in this situation;
3. to compare the findings from this study with those that emerged from an earlier investigation of clerical workers in an insurance company.²

¹A program of research on the fundamental problems of organizing human behavior. Survey Research Center, University of Michigan, 1947.

²KATZ, D., MACCOBY, N. and MORSE, NANCY. *Productivity, supervision and morale in an office situation, part I*. Survey Research Center, University of Michigan, 1950.

Productivity, supervision and employee morale. Survey Research Center, University of Michigan, 1948.

This study is patterned after the earlier study of clerical workers which also explored the relationships of supervision, employee attitudes and productivity. To establish the generality of findings from the clerical situation, it seems essential to repeat the investigation in other types of work settings. Ideally, a representative sample of all industrial situations should be studied, but this approach is not immediately feasible. An alternative is to investigate, in a widely different setting, some of the same factors found to be related to productivity in the first study.

The railroad setting was chosen because it differs so markedly from the setting of the study of clerical workers. The clerical situation is characterized by white collar groups, made up largely of young girls who are high school graduates and who work in large office buildings in a metropolitan area. In the railroad situation the workers are all men who perform heavy, manual, outdoor labor, who live mostly in small villages or towns or on farms, whose median education is fifth to eighth grade, who are mostly over 40 years old. The employees in the clerical situation work in close physical proximity to other groups of company employees and to various levels of supervision. In the railroad study contact among the various maintenance of way gangs is limited. The railroaders are geographically separated from the central organization of the company and their contact with upper level supervision is restricted to occasional visits from the track supervisors.¹

Study Design and Procedure

Both studies set out to test hypotheses about the relation to group productivity of various employee attitudes, supervisory attitudes, and

¹Despite these differences, the two study settings are similar in some very important respects. Both study populations are performing low skilled jobs. Both tend to be low in job mobility aspirations and to be quite satisfied with most aspects of the job situation. Trade unions play a less prominent role than in many industries. (The clerical workers are not unionized at all. Most of the railroad workers belong to the Brotherhood of Maintenance of Way Employees but their work situation minimizes their contact with the union.) These similarities may be important determinants of some of the similar results obtained from both studies.

types of supervisory behavior. In both cases it was necessary to find work groups that differed in productivity but, at the same time, were comparable with respect to technical factors affecting production.

The railroad section gangs in this study have as their job the maintenance of track, roadbed, and the rest of the right-of-way for a given section of track. They put in railroad ties, lay rail, clean switches, cut brush, build fences. The sections of track differ on a number of technical factors. Mileage varies. Ballast may be stone, gravel, cinder or dirt. Rail is usually heavier along main line track. Some roadbed is straight and level; some is laid around curves and over grades. Some roadbed traverses marshy areas; some travels over firm, dry ground. The numbers of men differ in the various section gangs. All such factors produce differences in group performance that are not a function of supervision or employee motivation.

To find pairs of work groups as comparable as possible on these objective and technical work factors, judgments and ratings were obtained from managerial personnel thoroughly familiar with the problem. The maintenance of way section gangs studied are part of the three American divisions of the Pere Marquette District of the Chesapeake & Ohio Railroad. Each section is headed by a foreman who reports to a Track Supervisor. The Track Supervisor, who is in charge of a number of foremen, reports in turn to a Division Engineer. The Division Engineer heads up the Maintenance of Way Department for his division. The three American divisions contain a total of about 180 sections.

The three Division Engineers and their Track Supervisors independently selected pairs of sections that they judged to be reasonably comparable with respect to terrain, ballast, weight of rail and single or multiple trackage. Pairs of sections on which there was disagreement with respect to these factors were eliminated.¹ In all, forty pairs of sections were judged to be very similar in technical work conditions.

¹In a few instances, the raters resolved their disagreements by discussion. The non-comparable factors were judged so inconsequential in nature or magnitude that they did not invalidate the pairing.

After judgments were made on comparability, the Division Engineers and Track Supervisors rated sections under their jurisdiction on job performance. Working independently, they judged which section in each pair was doing the better job in terms of over-all quality and quantity of work performed. Smoothness of track and alignment of roadbed were given special emphasis as criteria of work quality.

On 36 of the 40 pairs of sections, the Division Engineer and Track Supervisor agreed that the same member of the pair was superior in performance to the other.¹ These are the 36 pairs selected for study.

In this report the 36 sections judged superior to their counterparts are referred to as "high" sections, while the 36 sections judged inferior are called "low" sections.

Although the sections in each pair are comparable in size, there were small size differences in some cases. In all, the high sections contain 156 men and the low sections 142.

There are, of course, objections to evaluating group productivity through a method involving subjective judgments, but objective productivity records, which take account of the many different tasks performed by section gangs, were not available in this study.

The procedure of comparing the productivity of matched sections, used both in this study and the study of clerical workers, raises the problem of the possibility of overlap in productivity between high and low sections. Are the high sections of some pairs actually lower in productivity than the low sections of some other pairs? This question could not be answered by clerical data because the type of work varied considerably from one pair of sections to another and productivity records cannot be compared for sections that are not performing the same sort of tasks.

¹On three of the four remaining pairs of sections, both judges agreed that the pairs were equal in productivity. On the fourth, the Division Engineer rated one section as superior to the other, and the Track Supervisor rated them as equal.

In the present study, however, the type of work performed by the various pairs of sections is similar and it is possible to obtain some relevant judgments about productivity overlap. Several weeks after the 36 pairs of sections had been selected, one track supervisor was asked to name his five highest producing and five lowest producing sections, without regard to comparability of working conditions. He rated at the top the four sections that were the "highs" of the four selected pairs under his supervision; he rated among his bottom five the four "lows" of the study pairs.

Similar suggestive evidence comes from the Chief Engineer of the Pere Marquette District and from his second in command, the Engineer of the Maintenance of Way. These two men went over the entire list of selected sections and said that, in their judgment, only one low section performed better than the high member of another pair. (In a few instances, however, their information was not sufficiently current to permit them to make judgments.)

The study moved into the field in the fall of 1948. All 298 workers in the 72 sections were intensively interviewed by Survey Research Center staff after the interview schedule had been thoroughly pretested.¹ The interviews were of the free-answer type and averaged about an hour and one-half in length. The 72 foremen were similarly interviewed with another schedule after the rank-and-file interviewing had been completed.² All interviewing took place on the job between November 11 and the following January 13 except for one foreman on sick leave who was interviewed at his home on February 1.

Responses were recorded by the interviewers as nearly verbatim as possible and were coded by a separate staff using the standard content analysis methods of the Survey Research Center.³

¹See Appendix II, page 41.

²See Appendix II, page 49.

³See Appendix III, page 55. For a more detailed description of coding procedure see: Introductory statement on coding. Survey Research Center, University of Michigan, October 7, 1949. Code construction, Survey Research Center, University of Michigan, July 20, 1949.

Analysis of results of the railroad study follows the same general plan employed in the study of clerical workers. Variables tested for possible relationship to section productivity are divided into two major categories:

1. the "morale" of the non-supervisory employes, — i.e. their attitudes toward their work and various aspects of their work situation (satisfaction with the company, with their fellow workers, with their chances for promotion, etc.)
2. the attitudes of the foreman and his relationship to the men in his section, — i.e. how the foreman and men perceive each other, how the foreman perceives and fulfills his functions, etc.

To determine whether a relationship exists, both for foremen and employes, between sectional productivity and variables within these categories, comparisons are made between high and low producing sections. Chi-square is used to test the null hypothesis that there is no real difference between the supervisors or employes of the high and low groups on a given item and, consequently, no relation exists between this item and productivity. The null hypothesis is rejected and the relationship is described as statistically significant when it is found that the obtained difference would be likely to occur by chance five times or fewer in a hundred if the true difference between the highs and lows were really zero.¹

Problems and Limitations in the Study Design

There are several problems involved in the study design and analysis. One problem arises from the fact that interview responses, rather than observational measures, are used as measures of the supervisors' practices and attitudes toward their men. This problem arises especially in the supervisory interviews because foremen may be expected to report what they judge to be "desirable" practices whether or not they actually employ them. For this reason, super-

¹All tables in this report, unless otherwise indicated, present results which are statistically significant at the five per cent level.

visory behavior is measured by the non-supervisory as well as the supervisory interviews. A considerable portion of the non-supervisory interview is devoted to obtaining the men's perceptions of the behavior of their supervisor, of his relations with them and of his relations to others in the section. Although employee perceptions are also subject to bias, they do serve as an independent check on the supervisors' responses.

Another problem stems from the use of sectional, rather than individual, productivity data. We do not know the productivity of the individual members of any section. Perhaps just a few people in a high or low section are responsible for its superior or inferior performance. We have to treat the section as though all its members are high or low producers. This consideration does not, of course, invalidate any positive findings but it may militate against the appearance of any positive results in this study.

As one of the first studies in a long range research program, this investigation of railroad workers has definite limitations. Like the earlier, clerical study, it is largely exploratory and empirical and has many of the same limitations pointed out in the report of the clerical study.¹ As stated in the previous report, the measurements are extensive rather than intensive; rather than concentrating on a small number of variables and attempting to measure them thoroughly, an attempt is made to measure a large number of variables, frequently through single questions. In the analysis of the significant relationships found between variables of supervision or employee attitudes and productivity, this study attempts only to establish the existence of relationships, not the nature of the causality involved. One of the main purposes of the present study is to help define the variables and hypotheses which will be more rigorously tested in the program's future surveys and experiments.

The findings from the railroad study are presented in the remainder of this report. Chapter II gives the findings relating productivity to foreman attitudes and to foreman-worker interrelations.

¹KATZ, D., MACCOBY, N. and MORSE, NANCY. *op. cit.* page 1.

Chapter III reports the findings relating productivity to worker attitudes. Chapter IV presents a comparison of the findings of this study with those from the earlier study of clerical workers in the insurance company.

Chapter II

Productivity and Supervision

A picture of the foreman of a high producing section emerges from this study. The high foreman is one who can clearly distinguish between his own functions and those of his men, who effectively fulfills a leadership role and who, at the same time, takes a personalized approach to the men he supervises.

The details that make up this picture come from an analysis of the findings that relate sectional productivity to supervisory variables. The information on attitudes and practices of section supervisors is drawn from both supervisory and non-supervisory interviews.

The supervisory variables and their relation to productivity are presented in the following order:

1. Demographic characteristics of foremen
2. Foreman's satisfaction with his job and other aspects of the work situation
3. Foreman's relation to his men
 - a. foreman's assumption of a leadership role
 - b. foreman's attitude toward his men
 - c. foreman's evaluation of his section
4. Foreman's relation to his own supervisor.

Demographic Characteristics of Foremen

A possible explanation for differences in section productivity is that the foremen may differ in education, length of service and other demographic characteristics. This, however, is not the case in this study. Foremen of high and low sections do not differ essentially in their background characteristics. Heads of high sections

have had, on the average, slightly more education and slightly more experience as foremen than heads of low sections but neither of these differences is statistically significant. The only statistically significant difference in this area is that more foremen of low sections report having had some previous job in another field (usually farm or factory) while more foremen of high sections have worked only on the railroad. All other background characteristics measured in this study — age, birthplace, marital status, size of family, place of residence, length of service on the Chesapeake & Ohio Railroad — show no differences between the two groups of foremen.

Foreman's Satisfaction with His Job and Other Aspects Of the Work Situation

High and low foremen do not differ significantly in their general job satisfaction, nor in their reasons for being satisfied or dissatisfied with their jobs. No differences appear in their satisfaction with working for the company, in their attitude toward wages, in their satisfaction with their financial status, or in their expectations of and satisfaction with job promotion prospects.

One statistically significant relationship does appear in this area. High and low foremen differ in their satisfaction with their jobs as foremen (Table 1).

Table 1
*Relation to Section Productivity of
Foremen's Attitudes Toward Job*

Question: "How do you feel about being a foreman?"					
	Enthusiastic	Satisfied	Pro-Con* or dissatisfied	Not ascertained	N
Foremen of High Sections	10	15	10	1	36
Foremen of Low Sections	4	26	6	0	36

*"Pro-Con" includes those foremen who indicate that they are satisfied in some ways and dissatisfied in others.

The difference in Table 1 is significant but its meaning is unclear, for it indicates that more high foremen are both enthusiastic and dissatisfied with their jobs as foremen. It is possible that these more extreme responses indicate a greater involvement in their jobs on the part of the high foremen.

Foreman's Relation to His Men

Findings from both foremen and rank-and-file interviews indicate that the foreman-worker relationship in the high sections is typically quite different from the relationship existing in low sections. This difference can be divided into three main areas:

1. Foreman's assumption of a leadership role
2. Foreman's attitude toward and interest in his men
3. Foreman's evaluation of his section

Foreman's assumption of a leadership role

In his relations with his work group the foreman can perform the role of an active leader and assume the important functions of leadership, or he can merely carry out routine supervisory functions and sometimes even operate as just another worker in the section. Findings from this study indicate that the foreman of the high production section is better able to differentiate between the functions of supervisor and worker and to fulfill a leadership role. Evidence for this conclusion comes from four sources.

One method for determining whether the foreman plays a leadership role is to have him estimate the proportion of time he spends on supervisory activities and the proportion of time he spends working as another member of the section gang (Table 2).

Significantly more of the foremen of high sections than of low sections report spending a larger proportion of time in supervision. Significantly more of the low foremen than the high report spending a larger proportion of time in straight production work.

Table 2
*Relation to Section Productivity of
 Time Foreman Spends in Supervision*

Question: "How much of your time do you usually spend in supervising and how much in straight production work?"					
	Over 50% in super- vision	50% in super- vision	Less than 50% in su- pervision	Can't sepa- rate the two	N
Foremen of High Sections	11	9	11	5	36
Foremen of Low Sections	4	5	22	5	36

In their reasons for spending time supervising rather than doing straight production work, high foremen tend to stress the effectiveness of supervision in helping their sections do a better job while low foremen are more likely to regard supervision as a routine function. The two most frequently given reasons for devoting time to supervision are that the men need to be watched and that the foremen can get the section to do more or better work by supervising than by pitching into the production. About an equal number of high (11) and low (9) foremen say that they spend time supervising because the men need to be watched. The idea that one can get more accomplished by supervising, however, is mentioned by ten high foremen and only two low foremen (Table 3).

There is additional evidence that low foremen are less likely to perceive the supervisory role as a separate and distinct function in the reasons they give for not spending much time in supervision. Their chief reason is that there is little supervisory work to be done. Only three mention lack of time and not one of the low foremen says it is easier to do things himself (Table 4).

Another method for determining whether the foreman plays a leadership role is to get a description of how he spends his working

Table 3
*Relation to Section Productivity of
 Foreman's Reasons for Spending Time in Supervision**

	Foremen of High Sections	Foremen of Low Sections
Men need watching	11	9
Gets more work done	10	2
His job -- what he's supposed to do	5	8
Likes to see good job done	6	5
Miscellaneous	1	0
Not applicable (spends little time in supervision)	0	9
Not ascertained	3	3
	N = 36	N = 36

*Not statistically significant.

Table 4
*Relation to Section Productivity of
 Foreman's Reasons for Spending Little or No Time Supervising**

	Foremen of High Sections	Foremen of Low Sections
Not much supervisory work to be done	0	8
Not enough time to supervise	0	3
Would rather work than supervise	0	2
Easier to do things yourself	1	0
Miscellaneous	4	1
Not ascertained or not applicable (spends some time supervising)	31	22
	N = 36	N = 36

*Not statistically significant.

time. The high foremen mention more specifically supervisory duties such as planning and performing special skilled tasks, while the low foremen more often mention doing the same sort of things the men do (Table 5).

Table 5
*Relation to Section Productivity of
What Foreman Reports Doing on the Job*

	Supervisory Duties		Non-supervisory Duties		Number of duties mentioned*	N
	Planning; skilled tasks	Providing materials to men; Watching men	Same things men do	Keeping up track		
Foremen of High Sections	42	41	8	7	98	36
	83		15			
Foremen of Low Sections	25	42	15	14	96	36
	67		29			

*The responses total more than 72 because many foremen gave more than one answer.

The amount and effectiveness of the foreman's work-planning are other measures of how well he fills a leadership role. Work-planning is emphasized in this study in both the foreman and rank-and-file interview schedules.

In addition to the finding that more high foremen mention planning the work as part of their job, more high foremen also tend to report planning on a general or long-range basis, thinking about the job after working hours and planning their work after working hours. None of these tendencies, however, is statistically significant.

Statistically significant data from the rank-and-file interviews corroborate the finding that high section foremen are more concerned with planning the work. In their judgments of the planning ability

of their foremen, men in high producing sections perceive their supervisors as better planners than do men in low producing sections (Table 6).

Table 6
*Relation to Section Productivity of
Men's Perception of Foreman's Planning Ability*

Question: "How good is the foreman at figuring work out ahead of time?"					
	Very good	Pretty good	So-so and not very good	Not ascertained	N
Men in High Sections	38%	48%	2%	12% = 100%	156
Men in Low Sections	27%	54%	10%	9% = 100%	142

The fourth source for the conclusion that foremen of high producing sections are filling a leadership role better than foremen of low producing sections is some indirect evidence that more men of low sections than of high have taken over various leadership functions.

For example, the study reveals a tendency for an informal leader to arise more often in low producing than in high producing sections. This tendency is shown when more men of low than of high sections report that some one man in the group speaks up for the rest of the men (Table 7).

Although the proportion of men who perceive a group spokesman is small, and the proportion of non-response is large, this difference is a statistically significant one.

There is also the finding that more men in low producing sections make suggestions on the job than do men in high producing sections (Table 8).

Table 7
*Relation to Section Productivity of
 Men's Perception of a Group Spokesman*

Question: "Is there some one man in the section who speaks up for the men when they want something?"					
	Yes	No	Not ascertained	=	N
Men in High Sections	9%	47%	44%	= 100%	156
Men in Low Sections	17%	37%	46%	= 100%	142

The fact that more men in low sections than in high report suggestions being made to the foreman might be taken as an indication of more "democratic" behavior on the part of the low foremen. The findings, however, show that low foremen are not perceived by their men as any more receptive to suggestions than high foremen. A more likely interpretation, therefore, is that foremen in low producing sections are not exercising vigorous leadership of any

Table 8
*Relation to Section Productivity of
 Suggestion-Giving*

Question: "Which men (give suggestions to the foreman)?"					
	Employees who mention men giving suggestions	Employees who say men never give suggestions	Not ascertained	=	N
Men in High Sections	55%	15%	30%	= 100%	156
Men in Low Sections	73%	9%	18%	= 100%	142

sort, authoritarian or democratic, and that it is the low foreman's lack of competence which causes his men to make suggestions on how the work ought to be done.

Foreman's attitude toward his men

There are a number of findings, particularly from interviews with non-supervisory employees, which portray the foremen of high producing sections as being more interested in the general welfare of their men than foremen of low sections are.

1. Workers in high producing sections feel their foremen take somewhat more personal interest in their off-the-job problems¹ (Table 9).

Table 9

Relation to Section Productivity of Men's Perception of the Personal Interest Foreman Takes in Them

Question: "How much interest does he (the foreman) take in how you are getting along outside the job?"

	Great deal of interest	Moderate interest	Little or no interest	Not ascertained	N
Men in High Sections	15%	30%	36%	19% = 100%	156
Men in Low Sections	13%	21%	53%	13% = 100%	142

The most frequently mentioned kind of "outside the job" interest shown by the foreman is concern about the men's family life. The kinds of interest shown do not differ for the two groups.

¹There is no significant difference between high and low section workers in their perception of the foremen's interest in their on-the-job problems. This may be due to some ambiguity in the wording of the question, "How much interest does your foreman have in how you are getting along with your work?" Many men may have answered the question in terms of the foreman's interest in the work rather than interest in the employee.

2. Workers in high producing sections feel their foremen are more helpful in training them for better jobs. Although more men in high sections say that their foreman trains them for better jobs, the high-low difference is not statistically significant. Statistical significance emerges, however, when the ways in which the foreman does this training are examined. More high section men report that their foreman teaches the men new things, such as special techniques, skilled processes or some of the foreman's supervisory duties. When low section men report training by the foreman at all, more of them describe it as consisting of better and easier ways of doing their usual tasks (Table 10).

Table 10
*Relation to Section Productivity of
Ways Foreman Trains Men for Better Jobs*

Question: "In what way (does the foreman train men for better jobs)?"					
	Teaches men new techniques and duties	Teaches men better or easier ways of doing usual jobs	Doesn't train men	Not ascertained	N
Men in High Sections	29%	21%	33%	17% = 100%	156
Men in Low Sections	17%	24%	44%	15% = 100%	142

The high-low difference on ways of training is of special interest because the objective situation seems to militate against its appearance. There is very little opportunity for advancement as far as most section gang workers are concerned.

3. More workers in high producing sections feel that their foremen react non-punitively when the men do a bad job; more workers in low sections feel their foremen react punitively (Table 11). The finding comes from answers to a question in the rank-and-file interview schedule, "What does the foreman do when you do a bad job?"

Men who answer "bawls you out" or "makes you do it over" (without an explanation) are classified as perceiving the foreman as punitive; those who answer that the foreman "just tells you about it," "explains how to do it right," or "doesn't do much about it" are classified as perceiving the foreman as non-punitive.¹

Table 11
Relation to Section Productivity of
Men's Perception of Foreman's Reaction to Bad Jobs

	Foreman punitive	Foreman non- punitive	Not ascertained		N
Men in High Sections	35%	54%	11%	= 100%	156
Men in Low Sections	50%	36%	14%	= 100%	142

4. There is some indication that high foremen are more "men-oriented,"—that is, primarily concerned, in their jobs, with dealing with their men. There is also some indication that low foremen are more "work-oriented" or "self-oriented,"—that is, primarily concerned, in their jobs, with getting out the work or with the personal benefits that accrue from being a foreman. Asked why they like their jobs as foremen, more heads of high sections tend to give reasons based on their relations with their men while more heads of low sections tend

¹The men's report of the difference between high and low foremen in reactions to bad jobs is not corroborated by the foremen interviews. The foremen interviews also fail to reveal the high-low differences on training men for better jobs and personal interest in the men that come out of the rank-and-file interviews. One possible explanation for this tendency may be that foremen tend to report what they judge to be a desirable practice, whether they employ it or not. It is also possible that differences in the perceptions of their foremen by high and low section workers do not represent true differences in supervisory attitudes and behavior but merely reflect differences in general feelings toward their foreman. The data, however, does not support the latter explanation. High and low producing workers do not differ significantly in their liking for their foremen.

to mention things like responsibility for the work and steady wages. This difference, however, is not statistically significant (Table 12).

Foreman's evaluation of his section

The final area of supervisor-worker relationships considered here is the foreman's evaluation of his section. Again, there is a significant

Table 12
*Relation to Section Productivity of
Reasons for Satisfaction with Position as Foreman**

	"Men-oriented" reasons	"Work-oriented" or "Self-oriented" reasons	Not ascertained	Number of reasons mentioned**	N
Foremen of High Sections	23	17	8	48	36
Foremen of Low Sections	14	23	9	46	36

*Not statistically significant.

**The responses total more than 72 because some foremen gave more than one reason for liking their job as foreman.

Table 13
*Relation to Section Productivity of
Foreman's Evaluation of Section*

Question: "How does your section compare with other sections (in the division) in getting a job done?"

	Much better than other sections	Somewhat better than other sections	About the same	Not as good	N
Foremen of High Sections	11	10	15	0	36
Foremen of Low Sections	4	6	24	2	36

high-low difference,—foremen of high producing sections evaluate their sections more highly than foremen of low producing sections (Table 13).

The higher evaluation of their sections by the high foremen is further evidenced when foremen rank their sections into top, middle and bottom third. Significantly more foremen of high sections rate their groups as superior (Table 14).

Table 14
*Relation to Section Productivity of
Foreman's Ranking of Section*

	Top Third	Middle Third	Bottom Third	Not ascertained	N
Foremen of High Sections	22	10	0	4	36
Foremen of Low Sections	9	23	1	3	36

It is, in general, difficult to interpret the causality of a positive relationship between a foreman's rating of his section and the section's productivity. From this particular study it cannot be demonstrated whether the foreman's positive appraisal of his section influences its productivity or whether the foreman's appraisal is merely a report of what he perceives as the objective situation. Several considerations in the railroad situation, however, militate somewhat against the possibility that the foreman is merely reporting the objective situation.

For one thing, if the difference between high and low foremen's judgments of the ability of their sections was solely a function of objective perception, then the foremen should also differ in responses to questions which directly measure objective perception. There is no significant difference, however, between high and low foremen on questions about how many ties per man their sections

lay in a day, how frequently their sections help out other sections, or how frequently their sections are helped out by other sections.

Moreover, there is little opportunity for foremen to obtain official information on which to evaluate section performance. There are no sectional productivity figures, no company policy of officially rating a section, no institutionalized procedure for recognizing or rewarding "better" sections.¹ Of course, lack of institutionalized procedures does not preclude the appearance of informal channels of communication through which foremen might obtain some knowledge of their sections' comparative performance. The extent of information received through informal channels is difficult to assess, although it is probably somewhat limited by the fact that sections are geographically isolated from one another.

Foreman's Relation to His Own Superior

There is some evidence that the foreman's relations with his own immediate supervisor may have some bearing on the productivity of his section. Foremen of high sections tend to be more secure about their standing with the track supervisor, to feel less pressure from him and to be more satisfied with the amount of authority they have to get their job done. None of these relationships, however, is statistically significant.

Summary of Findings in Chapter II

Four main findings appear in this study in the general area of relationship of productivity to supervision.

1. High and low foremen do not differ significantly in degree of satisfaction with their jobs and other aspects of the work situation.
2. Low foremen do not clearly perceive their leadership role. High foremen are typically more aware of their position as leader

¹The results of the productivity ratings made for the purposes of this study were not, of course, communicated to the foremen.

and supervisor and are better able to function effectively in this leadership capacity. Four findings support this conclusion:

- a. Foremen of high producing sections spend much more time supervising and much less time in straight production work than do foremen of low producing sections.
- b. In reporting what they do on the job, foremen of high producing sections mention more specifically supervisory duties such as planning and special, skilled tasks. Foremen of low producing sections more often report doing the same things the men do.
- c. Men in high producing sections perceive their foremen as having better planning ability than do men in low producing sections.
- d. In low producing sections there is more of a tendency for the men to take over some of the leadership functions than there is in high producing sections.

3. Foremen of high and low sections differ in their attitudes toward their men. Foremen of high sections are more positive toward their men, take a more personalized approach to them and give more attention to problems of their motivation. Four findings support this conclusion:

- a. Men in high producing sections feel that their foremen take more personal interest in them than do men in low producing sections.
- b. Men in high producing sections report that their foremen are more helpful in training them for better jobs than do men in low producing sections.
- c. Men in high producing sections perceive their foremen as less punitive than do men in low producing sections.
- d. Foremen of high producing sections tend to be more "men-oriented" than foremen of low producing sections. (This difference is not statistically significant.)

4. Foremen of high producing sections evaluate their sections more highly than do foremen of low producing sections.

Chapter III

Productivity and Employee Morale

This study has revealed very few differences between high and low producing employees with respect to their attitudes toward the work situation. The great majority of men in both high and low sections express satisfaction with the work, the company, their fellow workers and their future prospects.

This lack of a high-low difference does not necessarily mean that worker productivity is completely unrelated to satisfaction with the work situation, but it does suggest that the relation between group productivity and satisfaction is not as great as is assumed. If the relationship is not large to begin with, it may very well be obscured in a single company where the range of productivity and satisfaction differences is restricted and where all workers are subject to the same company practices and the same general work situation.

This chapter examines the relationship to productivity of four variables dealing with employee attitudes. These are:

1. Attitudes toward work group
2. Intrinsic job satisfaction
3. Satisfaction with the company
4. Financial and job status satisfaction

This chapter also explores the possibility of a relationship between productivity and the demographic characteristics of non-supervisory employees.

Attitudes Toward Work Group

Men of high and low producing sections do not differ in their liking for the other men in the section, in their feeling that the men stick

together well, or in their reactions to the good and poor workers in their groups. They do differ, however, in their evaluation of their work groups. Like their foremen, men in high producing sections are more likely than men in low producing sections to see their work groups as superior to other groups (Table 15). The high-low difference for the men, however, is significant only at the 10% level.

Table 15
Relation to Section Productivity of
Men's Evaluation of Work Group*

Question: "How well do you think your section compares with other sections in the company in getting the work done?"						
	Very much better	Some-what better	About the same	Not as good	Not ascer-tained	N
Men in High Sections	21%	29%	40%	2%	8% = 100%	156
Men in Low Sections	11%	32%	47%	2%	8% = 100%	142

*Not statistically significant.

As in the case for the supervisory finding on evaluation of work group, the causality of the relationship between evaluation and group productivity is difficult to interpret. The relationship may signify either that the men's appraisal of their group is a morale factor which influences group productivity or that it is nothing more than an objective report of the group's relative productivity. Neither interpretation can be conclusively demonstrated in this study.

The question of causality is even more pertinent in the case of the non-supervisory employees than it is for the foremen. High and low foremen do not differ in responses to questions about their perceptions of section productivity. Non-supervisory employees, however, differ on a number of measures of section productivity. Men in high sections report that they put in more ties per man per day,

Table 16
*Relation to Section Productivity of
 Number of Ties Put In Per Day Per Man*

Question: "How many ties do the men in your section usually lay in a day?"					
	7 to 9 per man	10 per man	11 or more per man	Not ascertained	N
Men in High Sections	26%	18%	40%	16% = 100%	156
Men in Low Sections	22%	30%	30%	18% = 100%	142

Table 17
*Relation to Section Productivity of
 Assistance to and from Other Sections*

Question: "Do other sections ever come in and help out your section?"						
	Often	Occa- sionally	Some- times	Seldom or never	Not ascer- tained	N
Men in High Sections	8%	12%	31%	36%	13% = 100%	156
Men in Low Sections	12%	24%	28%	28%	8% = 100%	142

Question: "Does your section ever help out other sections?"*						
	Often	Occa- sionally	Some- times	Seldom or never	Not ascer- tained	N
Men in High Sections	28%	21%	15%	20%	16% = 100%	156
Men in Low Sections	20%	32%	17%	22%	9% = 100%	142

*Not statistically significant.

that they help out other sections more often and that they are helped out less often than men in low sections (Tables 16 and 17).

The differences between the highs and lows on these perceptual measures support the interpretation that when men in high producing sections evaluate their groups highly they are only giving an objective perception. There are two considerations, however, which militate against this interpretation.

1. There is little or no correlation between the men's general evaluation of the work group and their perceptions of section productivity in terms of several more specific criteria. Thus, the correlation is +.01 between evaluation of work group and estimated number of ties put in, +.11 between evaluation of work group and reports of helping out other sections, -.06 between evaluation of work group and reports of being helped by other sections.¹ These correlations suggest that the men's evaluation of their work group reflects something beyond mere perception of section productivity.²

2. Like their foremen, the men have no formal channels of communication through which they can get comparative productivity data on the various sections. There is also little evidence that men use informal channels for information about section productivity. In their reasons for their evaluations of their groups the men seldom refer to such sources of knowledge as contact with other sections or information from the foreman.

Intrinsic Job Satisfaction³

There is no difference between men in high and low producing sections in their general attitudes toward the overall work situation. There is, however, a significant difference in attitudes toward the content of the work itself. Workers who are most satisfied with the

¹These are tetrachoric correlations. None of them is statistically significant.

²The foremen interviews also fail to reveal a significant relationship between evaluation of section and the three non-attitudinal productivity measures.

³Intrinsic job satisfaction is defined as liking for the content of the work itself as distinguished from satisfaction with other aspects of the job.

content of the work are usually assumed to be the highest producers. In the study on the C. & O. Railroad, however, the men who express most satisfaction with the content of the work are members of the low producing groups. This finding holds constant under two different measures.

A direct question, "How about the work itself, how well do you like that?" reveals significantly more members of low than of high sections expressing strong intrinsic job satisfaction. High section members express more moderate satisfaction. Only a small proportion of either group expresses actual dissatisfaction (Table 18).

Table 18
*Relation to Section Productivity of
Men's Intrinsic Job Satisfaction*

	Very well satisfied	Satisfied	Pro-Con	Dissatisfied	Not ascertained	N
Men in High Sections	13%	65%	17%	3%	2% = 100%	156
Men in Low Sections	25%	50%	19%	5%	1% = 100%	142

Intrinsic job satisfaction is also measured in terms of the feeling of accomplishment a man gets from finishing a job. There is no high-low difference in reports of "getting a kick" out of finishing a job nor in reasons for this enjoyment. There is, however, a frequency difference. Members of low sections experience a feeling of accomplishment more often than members of high sections do (Table 19). The difference falls short of statistical significance but it is consistent with responses to the direct question about liking the work.

Table 19
*Relation to Section Productivity of
 Frequency of Men's Feeling of Accomplishment**

Question: "Does this happen when you finish most jobs or just once in a while?"						
	All the time	Usually	On some jobs, not others	Seldom or never	Not ascertained	N
Men in High Sections	35%	25%	1%	21%	18% = 100%	156
Men in Low Sections	34%	31%	10%	14%	11% = 100%	142

*Not statistically significant.

A third measure of intrinsic job satisfaction, the workers' identification with railroading,¹ reveals no high-low differences.

One explanation for the inverse relationship between productivity and intrinsic job satisfaction may lie in the low level of skill required by the work of railroad section gang workers. A high producer may have a high level of work aspiration and may therefore be thwarted in a low-skilled job. A low producer may have a lower level of work aspiration and may therefore be quite happy in a low-skilled job. Since level of aspiration is not measured in this study, this hypothesis cannot be tested. However, it is interesting to note in this connection that the same negative relationship between intrinsic job satisfaction and productivity comes out of the earlier study of clerical workers in an insurance company who also perform low-skilled jobs.² Moreover, the relationship between intrinsic job satisfaction and productivity changes in the railroad study when the skilled level goes up. Foremen, who can be considered more skilled than rank-and-file workers, do not show this inverse relation.

¹Identification with railroading is measured by such questions as, "Is there anything about railroading that would make you stick to it even if you could get another job?"

²KATZ, D., MACCOBY, N. and MORSE, NANCY. *op. cit.*; p. 1.

Satisfaction with the Company

There is little difference between men in high and low producing sections in their generally favorable attitudes toward the company. Both groups are very similar in their comparison of the C. & O.'s Pere Marquette District with other railroads as a place to work, in their reasons for liking and not liking to work for the company, in the length of time they plan to stay with the company and in their opinions on whether the men do a better job for the Pere Marquette than they would for some other company.

The study makes no attempt to measure attitudes toward company personnel policies because a pretest of the interview schedules disclosed very little knowledge of this area among the men.

Financial and Job Status Satisfaction

In the area of satisfaction with job status there is again no difference between men in high and low producing sections. Both groups are similar in their feelings about the status of their jobs in the eyes of their friends and in their own feelings about the importance of their jobs. There are also no high-low differences in expectations of advancement or in attitudes toward these expectations.

There is some tendency for more members of low than of high sections to be dissatisfied with their wages, but this difference is not statistically significant. Among both the highs and lows there is general dissatisfaction with wages.¹

Demographic Characteristics of Employees

In addition to examining the relationship between productivity and attitudinal variables, the C. & O. study also investigates the possibility that productivity differences may be caused, in part, by differences in education, length of service or other demographic factors. There is, however, no relationship. In both groups, the majority of workers are married, over 40 years of age, and natives

¹The interviewing was completed before a 20% increase in all hourly rates was put into effect.

of the state of Michigan. They have less than a grade school education, are low-skilled, and have spent a good part of their working lives in their present occupations.

Summary of Findings in Chapter III

Three main findings emerge from this study in the general area of the relationship between productivity and worker attitudes.

1. Men in high and in low producing sections do not differ in satisfaction with the overall work situation, with the company, with their job status or with wages. They also do not differ in many of their attitudes toward their work groups.

2. Men in high producing sections evaluate their work groups more highly than do men in low producing sections. This difference is significant only at the ten per cent level.

3. More men in low producing sections than in high express strong intrinsic job satisfaction.

Chapter IV

Comparison of Results

Study of Railroad Workers —

Study of Clerical Workers

Some conclusions about effective supervision are suggested by a comparison of results of the C. & O. study with those of the earlier study of clerical workers in an insurance company. Both studies have the same general design. Both studies have the same purpose—to investigate the relationship of employee and supervisory behavior and attitudes to productivity. Yet each study setting is so different from the other that findings which are common to both may have some degree of generality.

Relation of Supervisory Attitudes and Behavior to Group Productivity

The supervisor as a leader of his work group

Findings concerning the first-line supervisor as group leader are most clearly related to productivity in both studies and suggest the most similar conclusions for the two situations. The effective supervisor is able to differentiate his role as a leader from his role as a section employee, to remove himself occasionally from the actual operations of the group, and to spend his time planning the work, directing his employees and performing specific, highly skilled tasks. The less effective supervisor perceives himself less as a leader and more as a worker doing a job like the rest of the men in the section.

At the same time, the effective supervisor appears to take a personalized approach to his employees, is concerned with problems of motivating them and is sensitive to their needs. In the railroad study there are reports from the men of differences in behavior of

foremen of high and low sections. The rank-and-file in high sections see their foremen as more interested in the men's off-the-job problems, more helpful in training them for better jobs, and constructive rather than punitive in attitudes toward the men's mistakes. The same tendency is found in the clerical situation where heads of high sections are more "employee-oriented" than heads of low sections and tend to regard employees as "human beings" rather than as "people to get the work out."

In both studies, first-line supervisors of high and low producing groups differ in their attitudes toward their jobs as supervisors. In the clerical situation, heads of high sections emphasize personal dealings with employees as the most important part of their jobs while heads of low sections emphasize production and technical aspects. In the railroad situation, foremen of high sections tend to like their jobs as foremen for "employee-oriented" reasons and foremen of low sections for "work-oriented" or "self-oriented" reasons. (This finding in the railroad study is not statistically significant.)

In the area of close-versus-general supervision, however, the relation to productivity is not consistent in the two studies. In the clerical study, the heads of high producing sections exercise a somewhat general, non-detailed sort of supervision over their employees while heads of low sections exercise close, detailed supervision over their sections. In the railroad study, questions about how closely they supervise their sections show little difference between high and low foremen.

The difference in the structures of the two situations may account for the absence of any relationship at all between closeness of first-line supervision and productivity in the railroad study and the presence of a negative relationship in the clerical study. In the insurance company, work methods are sufficiently standardized so that employees get little help of a technical nature out of close, detailed supervision. Such supervision may, instead, be a threat and an annoyance to them. Among the railroad section gangs, on the other hand, there is less routinization of working procedure and more opportunity for individual attention from the foreman. Sections

are small enough to permit the foreman to give each man the benefit of his superior technical knowledge and to contribute to the effective performance of his men in this way. However, there is no positive relationship between productivity and close supervision in the railroad study and it is likely that the foreman's technical contribution is not sufficient to outweigh possible detrimental effects of close supervision on worker motivation.

The supervisor as a member of management

Another area of supervision that has a bearing on productivity in both studies (though it is not statistically significant in the railroad study) is the first-line supervisor's relationship with his superiors.

In both studies, high supervisors are more satisfied than low supervisors with the amount of authority they have in their jobs. (In the railroad study, this relationship is not statistically significant.) Supervisors of high sections tend to be under less pressure from above than supervisors of low sections (although, in both studies, this relationship is not statistically significant). Evidence from the clerical study supports the hypothesis that supervisors of low producing sections, who are under some pressure and close surveillance, in turn put pressure on their own workers. Results of the railroad study, however, do not bear out this hypothesis.

Neither study answers the question of whether the supervisor's autonomy contributes to the productivity of his work group or whether the relative performance of the work group determines the degree of autonomy a supervisor is granted. The relationship is probably a circular one and its exact nature must be explored in further studies.

Neither study reveals any relationship between worker productivity and the supervisor's general morale (liking for the company, satisfaction with wages, etc.).

Relation of Employee Attitudes to Group Productivity

Neither study shows as much relationship between employee attitudes and group productivity as it shows between supervisory attitudes and behavior and group productivity. A relationship shows up on only a few employee attitudes.

Evaluation of work group

In both studies employees in high producing sections evaluate their work groups more highly than employees in low producing sections. This is the only work group attitude measured on which high and low producing employees differ.

Intrinsic job satisfaction

The hypothesis that intrinsic job satisfaction is positively related to productivity¹ does not hold up for non-supervisory employees in either the clerical or railroad situation. In both studies employees in low producing sections express higher job satisfaction than employees in high producing sections. (The relationship is not statistically significant for clerical workers.)

This relationship may be a function of the unskilled nature of the tasks these employees perform. A person with higher job motivation and with a higher level of work aspiration may express less satisfaction with routine work, even though he works harder, than a person who expects less from the work he does. This inverse relationship would not be predicted in jobs involving more variety and skill and does not occur among the supervisors.

Attitudes toward the company and company practices

In neither study is the employees' overall liking for the company as a place to work related to productivity. This lack of relationship

¹For a demonstration that intrinsic job satisfaction varies directly with productivity see: KATZ, D. and HYMAN, H. *Morale in war industry. Readings in social psychology.* ed. Newcomb, T. and Hartley, E. New York: Henry Holt & Co., 1947. 437-447.

may be caused by the small range of productivity differences in each situation and by the use of group, rather than individual, productivity measures. It may reflect the fact that productivity differences are within a company instead of between companies. On the other hand, it may mean that over-all company satisfaction is related to an employee's desire to remain in the company as a member of a desirable social system, but that this sort of motivation stimulates only the minimum productive effort necessary to hold a position in the organization.

Employee attitudes toward certain of the specific items of company policy are measured in the insurance company study and not in the railroad study because the railroad workers do not know enough about them to express opinions. Again, the findings point to the possibility that attitudes of high producing employees may be influenced by their higher work standards and expectations. Clerical workers who tend to be more critical of the company placement and rating policies are more often members of high producing sections. Those who participate more in the company suggestion system and in athletic and recreational programs are more often members of low producing sections.

Economic security and job status

Other areas that do not seem to be related to productivity are satisfaction with wages and with job status. Again, this lack of relationship may be a function of the fact that each study concerns workers in the same company, under the same wage schedules, and with earnings scaled according to skill level rather than output.

Summary of Comparison in Chapter IV

When the studies of insurance company and railroad workers are compared, six major findings are consistent in the two situations:

Supervision and productivity

1. There is a direct relationship between section productivity and the assumption of a leadership role by the supervisor.

2. There is a direct relationship between section productivity and the "employee-orientation" of the supervisor.

3. There tends to be an inverse relationship between section productivity and the supervisor's feeling of pressure from above (not statistically significant in either study).

4. There is a direct relationship between section productivity and the first-line supervisor's feeling of autonomy with relation to higher-level supervision (not statistically significant in the railroad study).

Employee attitudes and productivity

5. There is a direct relationship between section productivity and the employees' evaluations of their work groups (not statistically significant in the railroad study).

6. There tends to be an inverse relationship between section productivity and employee intrinsic job satisfaction (not statistically significant in the clerical study).

Appendix I

Letter from Union Chairman To Maintenance of Way Employees

Chesapeake & Ohio System Federation
OF THE
Brotherhood of Maintenance of Way Employees

C. & O. Ry. P. M. Ry. R. F. & P. RR. Virginia Ry. N. F. & G. RR. D. & T. S. L. RR.
Potomac Yd. K. G. J. & R. RR. M. & N. R. Ry. Port S. U. D. Co.

F. M. CRANCE, General Chairman
408-409 Young Building
Lynchburg, Virginia

Office of General Chairman

LYNCHBURG, VIRGINIA
November 12, 1948

All Officers and Members of the
Chesapeake & Ohio System Federation
Brotherhood of Maintenance of Way Employees
Chesapeake & Ohio Railway - Pere Marquette
District

Greetings!

As a part of a long range program to find out how people can work together effectively, the Survey Research Center of the University of Michigan is making a study among employees of the Chesapeake & Ohio Railway, Pere Marquette District.

The representatives of the Survey Research Center have discussed this program with me on several occasions, and I have been made familiar with the purpose and intent of this survey, as well as being furnished a copy of the questionnaire and fact sheet to be used in conducting such survey.


I have investigated this matter thoroughly, and feel that it will be very beneficial to the Maintenance of Way employees in the final analysis, as this information will be put together with results from studies at other places so that general principles about how people work together can be discovered. I am informed that not all Maintenance of Way employees will be interviewed, but a cross section of the employees in the Maintenance of Way Department on each Division.

As I have stated, I have been made thoroughly conversant with this program and have endorsed same for the Maintenance of Way employees.

I respectfully request each of you, if interviewed, to cooperate to the fullest extent with the representative of the Survey Research Center who may contact you.

Thanking you for this consideration and with kindest personal regards, I remain

Yours fraternally,


F. M. Crance
General Chairman

FMG:jb

Appendix II

Interview Forms

Rank and File Questionnaire

Face Sheet

Name of Interviewer	Interview Date			
Interview No.	Interview Time	Hr.	Min.	
Writeup Time	Hr.	Min.	Division Name	
Section Name	Marital Status:			
Married	Single	Widowed	Divorced or Separated	Age
Birthplace: City	State	Country		
Education: Grade School (Yrs. Completed)				
High School (Yrs. Completed)				
Business or Trade School (Yrs. Completed)				
College (Yrs. Completed)				
(If 8 years) Did you graduate?	Yes	No		
1. How many people do you support?				
2. How much do you make an hour?				
3. Do you live in	? Yes	No		
a. How well do you like			as a place to live?	
Satisfied	Indifferent or so-so	Dissatisfied		
4. Are you a veteran of World War II?	Yes	No		
5. Have any other members of your family been in railroad work?				
Yes	No			
a. (If yes) Pere Marquette?			Other?	

6. What other jobs have you held on the Pere Marquette? (Dates held, titles, wages)

Job Title	Dates Held	Wages

7. What was the last job you had before you came to work on the railroad? (Dates held, title, wages)

- a. What other jobs have you had? (Dates held, titles)

Job Title	Dates Held	Wages

8. Do you have a trade? Yes No

- a. (If yes) What is it?

9. Race (Do not ask) White Negro Other

10. How many days' work have you had to miss during the last three months?

Rank and File Questionnaire

- How long have you worked on the Pere Marquette?
- How did you happen to take a job on the Pere Marquette?
- How long have you worked on this section?
- How well do you like your job?
- How about the work itself? How well do you like that?
 - What things about the work itself do you like?
 - What things about the work itself don't you like?

6. Not counting the work itself, what are the things you like or don't like about your job? (Probe for both like and dislike).
 - a. Does the job give you a chance to do the things you are best at?
 - b. How much chance do you have to be on your own?
7. How important is your job compared to the jobs most other men in the town have? I mean other men who aren't on the railroad.
8. How important is your job compared to other jobs on the railroad?
9. Is there anything about railroading that would make you stick to it even though you could get other jobs? (Probe fully — get reasons).
10. What do your friends who don't work for the railroad think of your job?
11. How important would you say the company feels your job is? (Probe—Why do you feel that way?)
12. In general, how do you like working on the Pere Marquette?
 - a. How do you think it compares with other railroads as a company to work for?
13. How long do you expect to work on the railroad? (If plans to leave, why?)
14. What is the highest job on the railroad you expect to get?
 - a. How do you feel about that?
15. Did you ever hope to get a higher one?
 - a. (If yes) What job was that?
16. Are you ever worried about getting laid off or losing your job? (Probe for reasons.)
 - a. Why do you feel that way?
17. Do you expect to be laid off this winter?

18. When you're at work, does the time usually pass slowly or fast?
(Probe for how fast time usually goes).
19. When you have finished doing a good job on something like lining or surfacing track, do you get a kick out of it or doesn't it make any difference?
 - a. (If makes a difference) Does this happen when you finish most jobs, or just once in a while?
20. Do you ever think about the job at night or after work?
 - a. (If yes) What things do you think about?
21. Do you watch the trains go over the track?
 - a. (If yes) What do you look for? Anything else?
22. How many ties do the men in your section usually lay in a day?
23. How do you feel about this amount? Is it too much? Too little? About right?
 - a. Why do you feel this way?
24. How do you feel about the amount of work your section turns out in doing other kinds of jobs? (Probe fully).
25. Does your section ever help out other sections in lining or resurfacing?
 - a. How often?
26. Do other sections ever come in and help out your section?
 - a. How often?
27. How do you feel about sections helping other sections?
28. How well do the men in your section stick together to get something they want?
29. How do the men feel about a man who turns out more work than everyone else?
 - a. (If R says no such man, ask:) How would the men feel about someone like that?

30. How do they feel about a man who turns out less work than everyone else?
 - a. (If no such men, ask how they would feel . . .)
31. Is there some one man in the section who seems to know what is going on—some one man whom everyone else pays attention to?
 - a. (If Yes) How do the men feel about him?
 - b. (If Yes) How does the foreman feel about him?
32. (Only if No on 31) Is there some one man in the section who speaks up for the men when they want something?
 - a. (If Yes) How do the men feel about him?
 - b. How does the foreman feel about him?
33. How well do you think your section compares with other sections in the company in getting the work done? (Probe: Why do you feel that way?)
34. Do you think most of the men are trying to do a better job for Pere Marquette than they would for some other Company?
 - a. (If no personal reference, ask:) How about you yourself? Would you say that you are trying to do a better job for Pere Marquette than for some other company?
35. How much difference does it make to the men in your section whether the section does a good job or not?
36. How well do you like the other men in your section?
37. Are there any men in your section who don't get along with the rest of the men?
 - a. (If Yes) How much difference does this make to the work of the section?
38. Do the same men do the same job on the section all the time, or do they shift around?
 - a. How do you feel about that? (Probe for what R does specifically).

39. How do the men work when the foreman is not around?
 - a. (If R says foreman is always there, ask:) How do you think the men would work if there were no one in charge?
40. If several men slow down on the job, what happens?
 - a. How often does this happen?
41. How well do you like your track supervisor (roadmaster)? Why do you feel this way?
42. How well do you like your foreman? (Probe) Why do you feel this way?
43. How does your foreman usually spend his time? What sort of things does he do on the job? (Probe for list of specific things).
44. How much time does he spend in working, just like the rest of the men, and how much time does he spend in supervision and things like that?
45. Does he ever pitch in and work with the men when the going gets rough?
46. How good is the foreman at figuring out the work ahead of time and things like that?
47. How often do you know ahead of time what you're going to be doing? (If answer is in terms of unexpected instructions to foreman from above, probe in terms of foreman's own planning).
 - a. How far ahead of time?
48. How does the foreman feel about the men giving him their ideas and suggestions on how things ought to be done?
 - a. (If prefers this) Which men? (Probe for whether a consultation with one or two senior men or whole group).
 - b. How often does the foreman use the men's suggestions?
49. How closely does he try to supervise the people in your section?
 - a. Do you ever feel that he is watching everything you do?
 - b. How do you feel about that?

50. How often do you feel under great pressure to get a job done?
(Probe) Does your foreman often rush you or put pressure on you to get work done?
51. How fair is the foreman in what he expects of the men?
52. Does your foreman usually let you know when you do a good job?
 - a. What does the foreman do when you do a bad job?
 - b. Which does he do most often?
53. How much pride does he take in the work of the section?
 - a. How do you know this? Why do you feel this way?
54. How much interest does your foreman have in how you are getting along with your work?
55. Do you know what he thinks of your work?
 - a. (If Yes) Do you think he is fair in what he thinks about it?
 - b. (If No) How do you feel about that?
56. Does the foreman ever help men to get promotions or transfers to better jobs?
 - a. (If Yes) How good is he at getting promotions or transfers put through for the men?
57. Does the foreman train men for better jobs?
 - a. (If Yes) In what way?
58. Does he generally think of the men as human beings or just as people to get the work out?
59. Is your foreman the kind of man you really feel like putting out work for?
60. How much interest does he take in how you are getting along outside the job?
61. How do you feel about your wages?

62. How do your wages compare with those for other similar jobs on the railroad?
63. How do your wages compare with those for other similar jobs around here not on the railroad?
64. How well does your foreman keep you informed about what goes on in the company?
- (If R indicates any dissatisfaction ask:) Is it because he doesn't know himself or that he knows and doesn't tell you?
 - Are there any other ways in which you find out what is going on in the company?
65. How much interest do you think most men here have in what the union (or brotherhood) is trying to do?
66. Are you a member of the union?
67. (If member) How many of the union meetings do you go to?
68. As far as you can tell, what does the union want most?
69. What does the company want most?
70. How about you? What things do you want most?

Foreman Questionnaire

Face Sheet

Name of Interviewer _____ Interview Date _____

Interview No. _____ Interview Time: _____ Hr. _____ Min.

Writeup Time: _____ Hr. _____ Min. Division Name _____

Section Name _____ Marital Status: _____

Married _____ Single _____ Widowed _____ Divorced or Separated _____ Age _____

Birthplace: City _____ State _____ Country _____

Education: Grade School (Yrs. Completed)
 High School (Yrs. Completed)
 Business or Trade School (Yrs. Completed)
 College (Yrs. Completed)

(If eight years of grade school or four years of high school)
 Did you graduate? Yes No

1. How many people do you support?
2. How much do you make an hour?
3. Do you live in _____ ? Yes No
 a. How well do you like _____ as a place to live?
 Satisfied Indifferent or so-so Dissatisfied
4. Are you a veteran of World War II? Yes No
5. Have any other members of your family been in railroad work?
 Yes No
 (If yes) a. Pere Marquette? Other?
 (If yes) b. What jobs have they held?
6. What other jobs have you held on the Pere Marquette? Dates held, titles, wages)

Job Title	Dates Held	Wages

7. What was the last job you had before you came to work on the railroad? (Dates held, titles, wages)

Job Title	Dates Held	Wages

a. What other jobs have you had? (Dates held, titles, wages)

Job Title	Dates Held	Wages

8. Do you have a trade? Yes No
(If Yes) a. What is it?

9. Race (Do not ask) White Negro Other

10. How many days' work have you had to miss during the last three months?

Foreman Questionnaire

(Introductory remarks) You have probably heard something about us and what we are doing here, but let me tell you a little more about it. We are from the Survey Research Center, University of Michigan, and are doing research on group morale. The general idea is to find out what makes for good morale. This study that we are doing here at the Pere Marquette is the fourth study of this kind we have been making. We have studied groups in a large insurance company, in a public utility, in an auto plant, and now on a railroad. The C. & O. has agreed to let us study certain sections in the maintenance of way department. We wanted the maintenance of way department because it has a lot of sections doing pretty much the same kind of work.

We are interviewing just certain sections—not all sections, just a sample. When we pick a section we interview everybody in it, including the foreman. Whenever we interview an employee, whatever he says is confidential. We are doing research—not an inspection job. This is a statistical study; so we don't want your name, and no one in the company will see any particular person's interview results. As soon as we finish an interview the results are sent to Ann Arbor where the answers are put on punch cards so that a

statistical report can be made. We hope that this study will help everybody do an even better job.

1. How long have you worked on the Pere Marquette?
2. How long have you been a foreman?
3. On the whole, how well do you like your job?
 - a. What things do you like best about it?
 - b. What things do you like least about it?
 - c. How do you feel about being a foreman? Why is that?
4. When you first left school and started working, what plans and ambitions did you have?
 - a. How have things worked out for you?
 - b. How do you think things will work out for you in the future?
5. What is the highest job on the railroad you would like to get?
 - a. What do you think your chances are of getting it?
6. What are the different things you do in your job as foreman? (Are there some others? Anything else?)
7. What parts of your job do you consider the most important? Why?
8. How much of your time do you usually spend in supervising and how much in straight section work?
(If 8 doesn't work use this alternative wording: How much of your time do you spend doing only the things that foremen do and how much time doing things the rest of the men do?)
 - a. Why do you spend this much time supervising?
 - b. What do you usually do when you are supervising?
9. Is there anything about railroading that would make you stick to it, even though you could get other jobs? (Why is that? Tell me more about that.)
10. Do you know where you stand with your track supervisor?
 - a. How do you feel about that?

11. How fair is he as a boss? (Tell me more about that.)
 - a. Can you give me some examples?
12. How much pressure does he put on you to get work done?
 - a. When does he put on the pressure?
13. Do you know where you stand with the company?
 - a. How do you feel about that?
14. Is there a patrolman along this territory?
(If yes)
 - a. How well do you and he get along?
 - b. Do you have any problem in how he deals with the men in your section?
15. How far ahead do you plan the work of the section?
 - a. How do you go about figuring what needs to be done and when it will be done?
 - b. When do you do this?
 - c. Does planning ahead make any difference? Why or why not?)
16. How do you feel about letting the men know ahead of time what they are going to be working on?
17. How often do you have to change your work plans because of instructions from the track supervisor?
 - a. How do you feel about this?
18. How much information on what is going on in the company do you feel the men need to know?
 - a. How do you feel about how much they are told now?
 - b. What do you do with the bulletins that you get from the track supervisor or others?
19. Suppose you need a new man, how do you usually go about getting him?
 - a. How did you happen to get the men you have now?
20. How do you go about breaking in a new man?

21. Considering what you are held responsible for, how do you feel about the amount of authority you have to get your job done?
22. Do you ever think about the job at night or after work?
(If yes) a. What things do you think about?
23. Do you usually have the same men do the same job, or do you shift them around? (Why do you do that?)
24. In your section, does it make much difference which men work together on certain jobs? (If yes—Why is that?)
25. What do you think is the best way to get a good job out of the men?
26. Suppose you feel that the men aren't getting enough work done in a day, what do you do about it?
 - a. What is the best way to get the right amount of production in your section?
27. What happens when your men do an unusually good job?
 - a. What happens when your men do a poor job?
 - b. Which happens more often?
28. How good a job are you usually willing to settle for?
29. How much attention do you pay to how each man in your section is getting along?
 - a. How does that work?
30. Do the men ever have ideas about what should be done or how a job can best be done?
 - a. Can you give me some examples of how that works?
 - b. How often do the men come up with ideas or suggestions?
 - c. How often are they good ones?
 - d. Do you think it is a good idea or a bad idea for the foreman to encourage suggestions from the men? Why?

31. Is there anything you can do to help good men get promoted?
 - a. (If yes) What?
 - b. Are you ever asked to make recommendations for men for better jobs?
 - c. How often does it happen that the man you recommend gets the job?
32. How good a group of men do you have for getting a job done?
33. How well do your men know their jobs?
34. What are the jobs you yourself have to do and what jobs can you have the men do?
 - a. Why can't the men do those jobs?
35. Usually there is a lot of difference between sections in getting a job done. How does your section compare with other sections in the division in getting a job done? Why? (Probe to force R to admit differences between sections).
 - a. Would you say your section is in the top third, the middle third or bottom third? Why?
36. How much do you have to get after the men to get the job done?
37. How hard do you think the men work when you are not around? (If foreman always around ask: How do you think they would work if you or an assistant were not around?)
 - a. Do you think you have the kind of men that can be put on their own or not?
38. What happens when one or more men slow down on the job?
 - a. How do the men (or you) go about it?
39. Suppose you are laying ties, about how many ties per man do the men lay in a day? (If conditions are pretty good, how many? If pretty bad?)
 - a. How many should they do?

40. How often does your section help out other sections when they're behind in their work?
 - a. How do you feel about that?
 - b. How often do other sections help you out when you're behind in your work?
 - c. How do you feel about that?
 - d. Which happens more often?
41. How do you feel about the pay? (Why is that?)
42. Do you do any other kind of work, like farming, besides your job as a foreman?
(If yes) a. How many hours a week do you work at it?
43. Are you a member of the union?
(If member) a. How many of the union meetings do you go to?
44. As far as you can tell, what does the union want most?
 - a. How do you feel about that?
45. What does the company want most?
 - a. How do you feel about that?
46. How about you, what do you want most?

Appendix III

Sample: Supervisory Code

Col. No.	Question
18	Q. 2. How long have you been a foreman? <ol style="list-style-type: none">1. Less than 1 year2. 1-3 years up to 43. 4-6 years up to 74. 7-10 years up to 115. 11-15 years up to 166. 16-20 years up to 217. Over 21 years
19	Q. 3. On the whole, how well do you like your job? <ol style="list-style-type: none">1. Very well satisfied—enthusiastic2. Satisfied3. Pro-con—stresses likes and dislikes about evenly4. Somewhat dissatisfied5. Extremely dissatisfied
20-21	Q. 3a. What things do you like best about it? <ol style="list-style-type: none">1. Outdoor work—physical exercise2. Steady job—security3. Good pay4. Convenient—close to home5. Interesting work—variety6. Likes performing specific manual labor, including likes performing foreman's technical operations7. Likes specific supervisory duties with respect to work8. Likes railroading in general

9. Likes men in section
10. Freedom on the job
11. Feeling of contribution to safety of railroad
12. Likes nothing about job
- xx. Not ascertained

Appendix IV

A Measure of Group Productivity Norms¹

Many previous studies on worker productivity have shown that productivity in a group is influenced by an informal standard which arises in the group and which is enforced by many subtle (and sometimes not so subtle) group sanctions.² Since a direct question on whether a group standard exists is not asked in the Chesapeake & Ohio study,³ an attempt is made to get at this factor by computing for each section the variance of answers to "How many ties do the men in your section usually lay in a day?" The rationale is that a low variance (i.e., the tendency for all the men in the section to give approximately the same production estimate) may indicate the existence of a group work standard.

The variances of the sections are computed on the basis of men giving coded answers to the question about the number of ties laid. Men who give no response, refuse to estimate, or give unclassifiable answers are omitted from the computation. Also omitted are men who state that their estimates of the number of ties laid represent too many or too few ties and, thus, do not conform to their personally desired standard. The men used in the variance computations are only those who give estimates and who state that these estimates represent about the right amount that each man should lay.

Variances are not computed for sections in which more than half the men are eliminated from consideration. A total of six sections

¹The major part of the analysis in this area was carried out by Mr. Arthur Floor.

²ROETHLISBERGER, F. J. AND DICKSON, W. J. Management and the worker. *Harvard University Research Studies*, 1934, 9.

COCH, L. AND FRENCH, J. R. P., JR. Overcoming resistance to change. *Human Relations*, 1948, 4, 512-532.

³A direct question on group standards was attempted in the pretest of the non-supervisory employee interview schedule but was unsuccessful.

are thus eliminated and there is a remainder of 66 for which variance values are computed. The variances obtained range from 0.000 to 14.000. The distribution of variances is sharply skewed, with a mean variance of 3.086 and a median of only 1.468. Sections which have a variance above the median are referred to as "high variance sections" and those which have a variance below the median as "low variance sections." There are 33 sections in each group.

There is some evidence from the foreman interviews to support the inference that low variance groups are those in which a group work standard exists. The expectation is that the foreman's estimate of his section's production will correspond more closely to the average estimate of his men in groups which maintain a work standard. This expectation is supported somewhat by the fact that the correlation between foreman and non-supervisory estimates is higher in low variance sections than in high variance sections. The product moment correlation is $+ .54$ for the low variance sections and $+ .30$ for the high variance sections. The difference, however, is not statistically significant.

To further test the assumption that low section variance on tie-laying estimates indicates the existence of a group work standard, high and low variance sections are compared on responses to a number of questions about the degree of group cohesion and mutual liking in the section. The hypothesis is that groups in which such a work standard exists will show greater group cohesion and mutual liking than groups which have not formed such a standard.

Results tend to support this hypothesis, although the evidence is far from conclusive. Section means are computed on two questions: "How well do you like the other men in the section?" and "How well do the men stick together?" Average section means are computed for both high variance and low variance sections; the difference between the high and low variance sections is tested for statistical significance by the t-test for small samples. Neither question reveals statistically significant differences but there is a tendency for men in low variance sections to report that the men stick together better ($p = .15$) and that they like their co-workers better ($p = .10$).

The difference between high and low variance sections is more clearly demonstrated by responses to, "Are there any men in the section who don't get along with the rest?" Of 33 sections in which no one reported such an "isolate," 24 were low variance sections and only nine high variance. This difference is significant at the 1% level by the Chi-square test against an even distribution.

There is, therefore, some, but not conclusive, evidence that low variance sections are more cohesive and bound by greater mutual liking than high variance sections. This, in turn, offers some indirect support for the initial assumption that low variance on tie-laying estimates is a sign of the existence of a group work standard.

The main interest in developing a measure of group work standard is to study the relation of such a standard to productivity. When variance values of high and low producing sections are compared, however, there is no apparent tendency for productivity to be related to the existence of a work standard. A similar number of high and low producing sections are characterized by low variance on the tie-laying question and, among these low variance groups, there is no tendency for high producers to report a greater number of ties laid than low producers.

Although these findings fail to support the initial hypothesis that high production is characterized by the presence of a high work standard, they also fail to prove conclusively that such a relationship does not exist. It is difficult to investigate a relationship of this sort in the railroad study. Not only is low variance on tie-laying estimates a crude measure of the existence of a group work standard, but it is also measuring that standard in terms of only one of the criteria used by higher level supervision in rating a section "high" or "low" in productivity. If productivity judgments had been based solely on the number of ties laid by a section, there might possibly have been a relationship between productivity and group work standard.

The lack of relationship between group productivity and work standard may also be caused by the fact that, although the existence

of a group work standard affects worker productivity, it does not affect all workers in the section the same way. The standard may serve to raise the production of some workers and lower that of others. Thus, the main difference between a section which has such a work standard and one which does not would be that all workers in the former would tend to produce the same amount whereas the workers in the latter would vary, even though the average for both sections may be the same. This would explain the lack of relationship in this study where sectional instead of individual productivity figures are used.

An interesting question involved in the study of a group work standard is how this standard is affected by and, in turn, affects the relationship between section members and foreman. Here, too, the measures in this study are probably too crude to uncover any relationships that might exist. When foremen of high and low variance groups are compared on answers to 32 questions dealing with aspects of the foreman's relation to the men in his sections, no significant differences appear on any of the questions.

An attempt is also made to relate the group work standard to other group norms. The assumption is that sections which have norms about productivity will also have norms about other aspects of group behavior. Again using low variance as a measure of the existence of a group norm, the variance of all sections is computed for: "How do the men feel about a man who turns out more work than everyone else?" and for "How do the men feel about a man who turns out less work than everyone else?" There is no relation, however, between variances on these questions and the variance on the tie-laying estimate. It was planned to compare, on a number of characteristics, sections above median variance on all three questions and sections below median variance. This grouping reduces the "above median" group to eight sections and the "below median" group to six, so the analysis was not pursued further.

The attempt to study informal group work standards and their relation to group productivity, to other group variables and to foreman variables is largely unsuccessful. There is some evidence that

the existence of a group work standard can be measured by the variance of the productivity estimates of the men in the section and that such a standard tends to arise in more cohesive groups and in those which are held together by mutual liking. The measure is probably too crude, however, to permit an analysis of the relation of such a standard to group productivity, to other group norms, and to the whole pattern of relationship between foremen and men in the sections.

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