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Experiments in Work System
Design: Economic and Human
Results

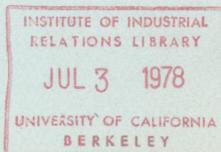
by

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Experiments in Work System Design: Economic and Human Results Part I

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General Introduction

This two part paper represents an attempt to enumerate and analyse recent instances of work system design experiments in terms of the outcome measures sought or reported in those studies. 'Work system design experiments' is intended to include only experiments dealing with sets of interrelated jobs, as opposed to those experiments solely manipulating either jobs which are dealt with individually, or changes in such things as work environment, or management climate. The literature comprising experiments in work system design contains a wide range of general end results variables, but, however, suffers from the associated fact that these numerous outcome measures are frequently poorly conceived or operationalized, and are not easily compared with one another from study to study.

Issues

There are several issues involved in such a review. 'Work system' design or restructuring is, in itself, a broad topic and the notion of 'recent' history is at best ambiguous; also, the term 'experiment' has been variously defined. In spite of these irregularities, the time seems right to assess the 'experimental' studies currently available in order to identify commonalities as well as the discrepancies among them. A review of literature in the general area of quality of working life through 1972¹ reported that the sheer number of published references had doubled for the period 1962-67 over the period 1957-62, and that it has doubled again during 1968-72. Within this expansion of the general literature was the much smaller subset of 'experimental' studies of work restructuring which increased apace during that period. This trend led us to expect that the number of experimental studies increased further between 1972 to 1976. This expectation has been confirmed.

Definitions

In order to proceed, several definitions are required. First, what is meant by work system design or restructuring is that an actual physical or structural change in the human jobs or tasks is undertaken, or a new process is introduced which represents a departure from conventional or predictable processes. Work system structuring is in part the design (or redesign) of a set or series of human tasks which, taken together, form some meaningful technical whole. Although work systems do of course contain jobs, work system structuring does

not usually start with jobs as the basic target of change, and it does not result in job changes as much as it results in role changes. Roles in this case contain not only the actual set of tasks a person does, but also include the network of work related interactions with others in the system. 'Work system structuring' usually results in some sort of task process or work group arrangement around some meaningful, or whole, technical aspect. 'Job enrichment,' on the other hand, starts with an individual job and proceeds to redesign that job from that point.

Included in 'experiments' is any case of actual change of manipulation in the work activities. Actually, this definition mainly includes 'natural' experiments of a sort where at least some minimal control of extraneous variables is obtained. As a rule these natural experiments involve a unit or subsystem within a larger plant or organizational site. Their performance is frequently compared with other similar units in the same location, and frequently with earlier (pre change) data from the same unit. By definition the cases included in the present review contain actual manipulation of the work system, although descriptions of the actual changes involved, (as well as evaluative data) are frequently poorly reported, or are absent. Descriptions of carefully designed and controlled experiments are virtually nonexistent in the literature.

Another aspect which must be noted as characteristic of this set of experiments is that successful outcomes are frequently (but by no means always) reported, while failures are hardly ever reported. This results in an overall effect which must appear more optimistic than the actual state of the world. On the other hand some experimentation (eg that reputed to be done in Proctor and Gamble over the past six to eight years) is believed to be very successful, but is hardly reported at all.

Job Enrichment

Another (and related) set of 'experiments' which will not be reviewed in the present paper is the set of 'job enrichment' studies which have been reported quite widely in the literature.² As stated above, job enrichment/enlargement studies can be distinguished conceptually from work system design/restructuring (WSD) in that job enrichment begins with individual jobs; already defined, while WSD begins with a technical whole from which human work assignments are made.

Results

Major Summary

There are over 120 cases of work system restructuring abstracted in the appendices provided in this and Part II of the paper. These cases were chosen from a variety of published and unpublished sources, because they resulted in group methods of work and job design. However it is not always clear whether these designs grew out of design procedures intended to look at whole work process, or whether they were the result of individual job design activities. Identifying some of the organizations involved will help to determine this: for example, the reports prepared by Philips Electric Company of experiments in their plants worldwide state the distinction clearly; while American Telephone and Telegraph (AT and T), because they have only recently discovered the advantages of designing for a total work flow, have only distinguished between the two only in their latest (14,40)^f reports of experiments.

Also as noted above nearly all the cases found report success either in productivity dimensions, or quality of working life (QWL) dimensions or both. Unfortunately, much of the latter are expressed in terms of general 'morale', attitude, or job satisfaction.

There are a few studies included in the present set which have stood the test of time and several which are so new that no output data are yet available. The remainder report experience over several years.

There are also in the present set of cases some which deal with issues of work system design less directly than they deal with issues of worker control in its broader aspects. These cases variously refer to processes such as 'industrial democracy,' 'QC circles,' or 'work planning groups' and have been included only if they have made some mention of control over work process or job and work design, and therefore meet the criteria above. These cases will frequently be found, however, to emphasize company policy-making over work place control and discretion. Both can be considered important and both can be manifest in the same organizational design.

Country of Origin

Although most reported cases of work restructuring are from the USA, and are covered in Part I of this paper, Sweden, the Netherlands and the UK, as well as elsewhere in Europe and Scandinavia also provide many interesting and important cases. These will be discussed in Part II of this paper. We can distinguish among cases reported for each country in terms of their general importance, which is defined by the joint satisfaction of several criteria, viz:

- 1 How much is known from available reports.
- 2 The degree and length of experience.
- 3 The centrality of the experimental manipulation to the work system or process.

Using these three criteria together, some of the cases can be sorted into a major category of those continuing cases of work system design (WSD) with reasonable experience noted and with adequate information. Such cases can be distinguished from those which are either too new, or so old that little relevance can be derived, and from those where too little is reported to be convincing, or from those in which work system restructuring seems a minor part of the total.

North America (USA and Canada)

49 cases of WSD are reported for North America; 15 fully

satisfy the three criteria noted above. Most of these 49 cases are in manufacturing, although the technological mix is considerable. These cases do not vary considerably in the size of the facility studied. Nearly all involve total departments of about 100 people in fairly small plants (100-300 employees). The best (based on the above criteria) of the manufacturing cases are Harman International, and American Telephone, in assembly operations (2,14); papermaking, oil refining, and food manufacturing (General Foods) in process technology (5,26,30); Donnelly Mirrors, R G Barry, and a corrugated box plant in machine operation and fabrication (4,10,17); and Kaiser Aluminum and an oil refinery in three cases of service and maintenance operations, both skilled and unskilled (20,27,28). One recent white collar case (1) reports WSD in several Social Security Offices, and innovations in mining operations are reported in Pennsylvania (3). Since these cases are among the best of the current US cases, we might expect them to set some fairly high standards with regard to outcome measures. In fact, only the cases of Donnelly Mirrors (17), Rushton Mining (3), and Social Security Administration (1) currently report both output measures and measures of organizational behaviour and employee attitude. Of the remainder, the four oil refinery cases and R G Barry have reported substantial social system and attitudinal measures (10,27,28,30), while the rest emphasize productivity or cost measures, and a substantial number report absence and/or turnover data.

12 of the 49 cases reported too little information to be included among the 15 sufficiently documented examples above. These cases include among others those from Proctor and Gamble (24), IBM (9), Corning Glass (13,33), and General Motors (6,7,8,12). Some of these cases are also quite old as well as lightly reported.

Several reasonably well written cases in the North American set are either old and assumed to have been discontinued (21,22) or are known to have been stopped (7,8,37,48). That does not mean that these are not valuable cases, or that some of the manipulations should not be studied (42). Some studies reflect management succession and changes in company priorities (23,25,39), while others (34,48) report circumstances unrelated to the success of the project altogether.

Several of the North American cases (2,3,41,42,43,44) represent the result of active cooperation between union and management. These cases all have a year or more experience, although detailed reports have not yet been made available for all of them.

The Survey Research Center of the University of Michigan's Institute for Social Research is engaged in studying work system design in hospitals, in conjunction with the National Quality of Work Center. The Center for Quality of Working Life at UCLA has been engaged in the redesign of white-collar systems in the insurance industry in both manual and computerized offices (eg case 45). These excursions into health care and other service industries have not yet been well documented - especially with regard to evaluative material on the success of redesigns. The Organizational Development Research Program, at the Michigan Institute for Social Research has recently completed and made available a carefully documented and evaluated study of redesign experiments in several Social Security District Offices (1).

Louis E Davis, of the UCLA Center for Quality of Working Life is, and has been, also engaged in the design of new plants, as has Richard E Walton of Harvard University's Business School. Little of the new plant design these men have aided in has been reported yet (5,26), but others are expected within the next year.

^fThroughout the paper bracketed numbers refer to the numbered case studies in Appendix I.

Type of Work

Most of the cases of work restructuring including the non US cases deal with assembly operations (40%). Semi-skilled machine tending is the next most frequent (20%), while white-collar work accounts for 20%. Process operations account for the fourth largest category (15%), and maintenance tasks are a poor fifth accounting for only 3% of the total number of cases. It is important to note an increasing proportion of white-collar cases reported in the past year.

Assembly Operation

Numerically the USA and Canada have the most cases of work system design (WSD) involving assembly operations.

Of the assembly cases in the USA with enough experience to report results, only five do so with any precision (6,10,12,13,14). American Telephone Company reports productivity improvement of 20-30% above standards (14). This case also reports considerable increase in quality, as does General Motors (12), R G Barry Company (10), and a case in Corning Glass (13). Absenteeism or attendance was mentioned as improved in most of these cases as well as in others (35). Of the remaining US cases four report some improvement in quality (6,9,15,39) or productivity (38) as a consequence of installing semi-autonomous assembly teams. The two other US cases are both reported failures. Nonlinear Systems (35) experimented nearly ten years with unconventional assembly procedures before returning to an assembly line in 1970. Reports of the other case (a GM Motor Home Factory) suggest an unsuccessful outcome (8).

Machine Operation

Experiments involving changes in work system design (WSD) in machine operation have little in common with the possible exception that a greater proportion of those cases report improvement in quantity of output, or productivity, and a lower proportion report quality or decrease in rejects as a result of the manipulation.

In the USA only two cases involving machine operations are included although several additional cases (2,16,41) could be mentioned as working both with fabrication and assembly. These latter have been already included above with assembly operations. Three of the North American cases report WSD innovations in clothing manufacture (10,35,36); also reported in the present section is the well documented case of Donnelly Mirrors (17). The very specific changes in this case involved problem-solving production teams set up around meaningful technical processes; and the outcome involved production increases of 48%, and some improvement in decision-making activity and satisfaction. Two other American cases draw from paper box manufacturing (4), and metal machining (39). Three additional cases involving machine operations are reported from the Labor-Management Cooperation Project in Jamestown, NY (42,43,44).

Continuous Process

17 cases overall are classified as involving experiments in work system design in process operations. Of these, nine cases are North American, the rest being European.

Seven of the nine North American cases are fairly recent, known to be continuing, and in most cases reasonably well documented.

- 1 The best known example is the Topeka Pet Foods Plant of General Foods (GF) Corporation (26). Begun in 1971, the plant continues to the present. Designed with autonomous groups who are responsible for an entire production process, the workers make most plant deci-

sions and are paid on the number of jobs they can perform. The results of this case reveal improvements in costs, reject rates, manpower requirements, safety, absenteeism and turnover compared with other plants in the GF system. Attitudes of team members are positive.

- 2 A small California plant manufacturing plastic packaging material has been in operation with modification since 1969 (25). Workers acquire a wide range of process skills, work semi-autonomously and actually work with maintenance people under the same supervisor. This case is known to have involved sociotechnical design procedures for modifying the work structure. Results in costs and output are favourable, with increases in production, run time capacity, reductions in supervision (up to 50%), and reductions in production personnel (18%). Because of the lack of any reliable attitude survey data, conclusions with regard to employee satisfaction must be somewhat tentative. There are reports of indirect evidence that employees reacted positively to the new jobs.

Experience with another, similar, plant in a different company has been reported recently (46).

- 3 A case of process operation in a large oil refinery was begun in 1969, and has continued and expanded to several other processes within the refinery. All functions involved in the operation of the process at the second level of management and below were brought together or fused under single operational administrations (30). The major result was to bring maintenance and operations into a closer understanding working more closely together. The results for the first two years included a 67% reduction in maintenance costs, productivity increases of from 10% to 30%, and increases in participative problem-solving behaviour and in employee satisfaction.
- 4 A case reported for Procter and Gamble in Lima, Ohio (24) is assumed representative of the many cases known to be undertaken by that company, but not publicly reported. The consumer product plant reported here has been in operation for at least five years; it is structured on the basis of work groups controlling plant matters of concern to their production operations. Results are sketchy, but reports indicate a reduction in overhead as well as in operating costs.
- 5 A new corrugated box plant in Georgia was designed on sociotechnical principles and was opened in 1973 (4). The plant operates on two shifts with three autonomous work teams on each shift. Within each shift, each team is responsible for a particular operation, function, or process machine. With two and one half years experience, absenteeism is lower than in other plants in the system, production is higher, and costs are lower. Interviews with employees indicate a favourable response to the new plant.
- 6 Florida plant producing tyre yarn was set up in 1968 to include groups of chemical workers whose boundaries extended across shifts (32). Jobs were restructured and some jobs were eliminated by automation. Results are meagre, but reports of zero waste and improved employee use of the company suggestion system imply positive effects.
- 7 A large integrated papermill, newly built and designed on sociotechnical principles, was started-up in the Tennessee Valley in March, 1975. Semi-autonomous groups are responsible not only for production operations, but for maintenance and major aspects of quality assurance and pollution control activities as well (5). In spite of technical problems in start-up, initial performance is bet-

ter than expected, and turnover has been lower than traditional labour market conditions would predict.

- 8 One of the oldest continuous process experiments in the USA involves a plastics facility in the American midwest. Although it is reported as very successful, some changes have occurred in the succession of four plant managers following the one responsible for the original design (23). This facility was opened in 1961 and was designed without foremen, with employees participating in most work system decisions with the plant manager. Workers were salaried, with differences among them based on degree of responsibility. Between 1961 and 1967 productivity was reported to have increased by 11 times, while personnel increased by a factor of three. The plant is said to have doubled its work force again since 1967, and it is still using many of the structural features of the original design.

The other North American case in continuous process technology has been discontinued because of circumstances apart from their success as design experiments.

This discontinued experiment is a case in aluminum casting and smelting (48). This systematic design of work process and organization resulted in a one year experiment (1970-71) with semi-autonomous groups of workers interchanging of tasks. The outcomes of this case suggest high employee satisfaction with the plan, good ability to meet emergencies, as well as improvement in productivity and reduction in costs. At the end of the experimental period, management and labour attempted to work out a plan for continuance, but were unable to do so. The company reportedly remains interested in the new design of work systems.

White-collar

White-collar work is involved in 21 cases of the 120 dealing with work systems collected and reported here and in Part II. The number of reported cases has been increasing recently in this category, although it is very broad and can include a variety of different types of work (eg supervisory, administrative, professional, clerical, sales, etc).

Seven of the cases are from the USA. Two of those describe experiments with foreman jobs. One of these (34) is well documented, although more than ten years old, and reports the effects on subordinate group behaviour of changed supervisory responsibilities. Perceptions of supervisory concern and relations with other groups are reported as evidence of improvement in those areas. Already low levels of absence, turnover, and grievances were unchanged. The other two American white-collar cases report work modifications based on consideration of factors beyond individual jobs for professionals in an R and D department (36), and for salesmen (18). In the former case, wide-spread subsequent company support is identified as an indication of the experiment's success. In the latter case sales volume increased considerably over control groups. One well known experiment in aut-

onomy vs hierarchical control for clerical workers resulted in improved morale for the former treatment and in improved productivity for both treatments (19). One very recent American case reports the redesign of a telephone company central office engineering division (40). The description of results available are unfortunately meagre so far. Another recent white-collar case (1) on the other hand has been extensively described and very carefully evaluated. The Organizational Development Research Program at the University of Michigan's Institute for Social Research has prepared a very useful and candid report of a 1975 work system design of several claims processing units in The Social Security Administration. The results are generally favourable. Finally, a case of redesign of a small claims processing unit in a private insurance company has been released recently (45). The case reports some successes in design process, together with some failures in implementation. The case itself is too recent to report either economic or human results.

One US construction crew experiment produced good morale but failed to affect productivity (22). The other also reports significant changes in worker attitudes as well as reported changes in organizational behaviour (29).

In the area of maintenance and repair work, one 1972 case (27) reports combining of two separate crews for loading and unloading oil tankers. Attitudes in this case showed some improvement. The other case reports autonomous maintenance work crews in an aluminium plant. Morale has been reported improved, tardiness eliminated and maintenance costs lowered (20). A very recent Canadian case reports almost two years experience with multiple overlapping skills and group work in a small unit of airline overhaul mechanics (49).

In the case of a motor pool, setting up mission oriented teams reduced personnel costs 70% while improving satisfaction (28). Janitorial teams of 19 members in another case contributed to planning, problem-solving, goal-setting, and scheduling (21). The results included cost savings over two years, quality improvement, and reduction in turnover.

A discussion of the age of the cases involved, the care in the experimental control, and the type of results reported will be provided in Part II of this paper. Part II will also consider what general conclusions may be drawn from the survey overall.

References

- ¹ J C Taylor, 'Concepts and Problems in Studies of the Quality of Working Life', monograph prepared for the Manpower Administration, US Department of Labor, 1973.
- ² See, for example, R Ford, *Motivation Through the Work Itself*, American Management Association, New York, 1969.

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	<p>(1)</p> <p><i>Social Security Administration</i></p>	<p>(2)</p> <p><i>Harman International Industries, Inc</i></p>
1 <i>Establishment(s) or employee groups</i>	1 8 district offices, (4 experimental, 4 control) claims processing units, 30-60 employees per site	1 Manufacturing of auto mirrors. Machine and assembly operators. Bolivar, Tennessee. Unionized (UAW).
2 <i>Year initiated</i>	2 1975	2 1973
3 <i>Number of employees affected</i>	3 150 employees total affected by the change	3 1000 hourly, 120 salaried/management
4 <i>Problem, or initial condition</i>	4 The greater satisfaction and productivity of smaller offices in SSA were hoped for outcomes of redesign of larger offices in autonomous work groups	4 Interest in examining new ways of working
5 <i>Technique used</i>	5 Experimental offices planning teams helped decide on the number of work groups, distribution of work load, physical layout and the areas of group autonomy. 6 weeks after the structural changes were implanted a survey feedback group development activity began	5 Worker designed effort to work in teams, rotate jobs, supervise themselves, and make other changes in work areas. Heavy emphasis on in-plant training, and individual development activities. Currently going into cost saving-sharing programmes, and child care programmes
6 <i>Human results</i>	6 Of the 4 experimental offices, 3 showed more favourable perceptions and attitudes than did the controls. One experimental office (with severe staffing shortages) showed a greater decline than its matched control	6 Most (over 600) people earn 'idle time' and leave work 1 to 5 hours early. Communication has improved and what dissatisfactions there are, are discussed with more candour
7 <i>Economic results</i>	7 Increases in several productivity measures for experimental offices were shown to be related to perceptions of organizational changes. In general better results. No significant changes in either absenteeism or turnover were noted	7 Productivity per hourly employee has increased from \$132 when project began, to \$155 in April, 1975, to \$165 in April, 1976. Costs of manufacturing and supplies have increased also in the experimental departments
8 <i>Reference(s)</i>	8 Bowers, Hausser, and Spencer. <i>District Office Organizational Development Experiment, Organizational Development Research Program, ISR, University of Michigan, June 1976</i>	8 <i>Business Week</i> , May 19, 1975. Testimony of Dr Sidney Harman before Senate Subcommittee on Employment, Poverty and Migrating Labor, April 8, 1976. David Suskind Television Programme, June, 1976
	<p>(3)</p> <p><i>Rushton Mining Co</i></p>	<p>(4)</p> <p><i>Container Manufacturing</i></p>
1 <i>Establishment(s) or employee groups</i>	1 Small coal mine, Pennsylvania. Unionized	1 Paper box plant, Covington, GA. Nonunion. Machine operator
2 <i>Year initiated</i>	2 1973	2 1973
3 <i>Number of employees affected</i>	3 27 cutters - volunteers from regular work force	3 50 employees
4 <i>Problem, or initial condition</i>	4 Interested in examining new ways of working	4 New experimental plant for examining new ways of working. 4 autonomous groups without jobs or job titles on each of 2 shifts
5 <i>Technique used</i>	5 Autonomous work group organized 9 cutters per shift. All miners put on top pay and were trained to rotate to any job on the team. Miners have responsibility for production. Shift foremen have responsibility for safety, and also act as planning officer, and training liaison	5 A 6 man corrogator group, a 4 man 'Flexo' group, a 2 man maintenance team, and one 'process manager' on each of 2 shifts, comprise the plant. Employees are paid for the number of skills they develop
6 <i>Human results</i>	6 Lower absenteeism, lower turnover. Cooperative spirit among members	6 1975 survey results reveal attitude levels above national norms. Higher turnover figures during 1975-76 suggest maladjustment to increased productivity on the part of some employees. Absenteeism 1.5% compared with division average 4.5%
7 <i>Economic results</i>	7 Lower supply costs, higher production rates, low accident rate, and lowest number of safety violations in the mine's history	7 1975, individual productivity 20% higher than 1974, and higher than other plants in the system. 1975 labour costs 25% lower than 1974

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| 8 | <i>Reference(s)</i> | 8 | <i>Ohio Quality of Work Project Newsletter</i> , Issue 3, Summer 1974
<i>Champaign-Urbana News Gazette</i> , 9/24/75, p 21
<i>Psychology Today</i> , October 1975
Trist, Sussman, and Brown, 'An Experiment in Autonomous Working in an American Underground Coal Mine', <i>Human Relations</i> (in press, February, 1977) | 8 | Personal communication, L E Davis, Graduate School of Management, UCLA, July, 1976 |
| | | (5) | <i>Integrated Paper Mill</i> | (6) | <i>General Motors</i> |
| 1 | <i>Establishment(s) or employee groups</i> | 1 | New installation, Stevenson, Ala. Non-union. Process-maintenance operators | 1 | Tarrytown, NY assembly plant. 4,000 employees 'Glass Room'. Unionized |
| 2 | <i>Year initiated</i> | 2 | March, 1975 | 2 | 1975 |
| 3 | <i>Number of employees affected</i> | 3 | 250 employees | 3 | 36 rear window installers (18 women, 18 men) |
| 4 | <i>Problem, or initial condition</i> | 4 | Company chose to apply sociotech design principles in planning new mill | 4 | Many grievances, strike votes, and disciplinary problems. Much scrap and salvage |
| 5 | <i>Technique used</i> | 5 | Semi-autonomous work groups responsible for process and maintenance, as well as for major aspects of quality control and pollution control | 5 | Employees taught problem-solving techniques, and began meeting with foreman and technical staff 1/2 hours weekly |
| 6 | <i>Human results</i> | 6 | Low turnover, high promotion rates to supervision jobs. Some frustration with the problems of starting the new plant | 6 | Grievances reduced |
| 7 | <i>Economic results</i> | 7 | In spite of technical problems in starting up, the initial performance was better than expected | 7 | Absenteeism reduced from 12% to 3%, \$26,000 savings in scrap reduction, \$60,000 savings in reduced water leak damage |
| 8 | <i>Reference(s)</i> | 8 | Personal communication, L E Davis, Quality of Working Life Center, Institute for Industrial Relations, UCLA July 1976 | 8 | Speech delivered to Academy of Management Meetings, Kansas City, August 1976. William T Horner, United Auto Workers, Detroit |
| | | (7) | <i>General Motors</i> | (8) | <i>GM Truck and Coach Division</i> |
| 1 | <i>Establishment(s) or employee groups</i> | 1 | Detroit plant #23. assembly of truck chassis for custom camper application. Unionized | 1 | Team assembly of motor homes. 300 workers at Pontiac, 100 employees at Gemini operation. Unionized |
| 2 | <i>Year initiated</i> | 2 | 1973-1974: open only 18 months, because of low demand for 'rec vehicles' | | |
| 3 | <i>Number of employees affected</i> | 3 | 200 workers | | |
| 4 | <i>Problem, or initial condition</i> | 4 | Opening this new low volume plant provided an opportunity to further test the stall-build concept of small team assembly | 5 | 6 member teams for body fitting and trim work, 3 member teams assembled chassis |
| 5 | <i>Technique used</i> | 5 | Assembly line combined with conventional stall building, where an entire chassis is built by one small 5-10 man group | | |
| 6 | <i>Human results</i> | 6 | Union members favoured the new production procedures rather than assembly techniques because they have had experience with both techniques | | |
| 7 | <i>Economic results</i> | 7 | 'Very successful' | 7 | Abandoned. (Perhaps low demand for rec vehicles) Author concludes unsuccessful, but reasons not given |
| 8 | <i>Reference(s)</i> | 8 | Personal communications, D Ephlin, United Auto Workers, Los Angeles, September 1974 | 8 | <i>Business Week</i> , May 12 1973, p 144 |

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| | <p>(9)
<i>IBM</i></p> <p>1 Assembly operator</p> <p>5 3-5 man teams build entire power supply unit</p> <p>6 Attitudes good</p> <p>7 Quality and quantity improved. System considered more adaptive</p> <p>8 Sirota and Wolfson, <i>Personnel</i>, May-June, July-August 1972</p> | <p>(10)
<i>R G Barry Corporation</i></p> <p>1 Columbus, Ohio slipper manufacturing plant, assembly</p> <p>2 1971</p> <p>3 350 employees</p> <p>5 Small teams - assemble and package. Goal-setting and problem-solving. Time clocks removed, salary replaced piece rate. Maintenance</p> <p>6 Attendance improved (now less than anticipated)</p> <p>7 12 months results no cost reduction, significant quality improvement, return on investment lower than expected</p> <p>8 Taylor, et al, <i>Quality of Working Life: Annotated Bibliography</i>, Center of Organizational Studies, Graduate School of Management, UCLA, 1972, #8012</p> <p style="margin-left: 20px;">Frohman, 'Small Team Production System (STPS)', April 1972, unpublished. Available from Mark Frohman, R G Barry Corporation, 78 East Chestnut Street, Columbus, Ohio 43215</p> |
| <p>1 Establishment(s) or employee groups</p> <p>2 Year initiated</p> <p>3 Number of employees affected</p> <p>5 Technique used</p> <p>6 Human results</p> <p>7 Economic results</p> <p>8 Reference(s)</p> | <p>(11)
<i>TRW</i></p> <p>1 Manufacturing plant. Assembly operator</p> <p>2 1972</p> <p>5 Created semi-autonomous workteam, assembled product as a team</p> <p>7 Productivity up 15%</p> <p>8 Glaser, <i>Improving the Quality of Working Life</i>, Human Interaction Research Institute, 10889 Wilshire Boulevard, Los Angeles, August 1974</p> | <p>(12)
<i>General Motors</i></p> <p>1 Lakewood, assembly plant. Unionized</p> <p>2 December 1969</p> <p>3 250 employees in 'Cushion Room'</p> <p>4 Generally unfavourable conditions</p> <p>5 Management uses employee participation in defining the tasks and jobs required for modification in process and model changes. Semi-autonomous operators located in separate buildings. Management team included general foreman, QC and staff people from various disciplines. Foremen met with subordinates for feedback of performance, and for input to management team for planning</p> <p>6 Surveys of satisfaction, organizational climate and leadership showed improvement in first year. Grievances reduced from 56 per month to less than 5</p> <p>7 Scrap cost reduced from 4% to less than 1% within the first year</p> <p>8 Dowling, 'System 4 Builds Performance & Profits', <i>Organizational Dynamics</i>, Winter 1975, pp 23-38</p> |
| <p>1 Establishment(s) or employee groups</p> <p>2 Year initiated</p> <p>3 Number of employees affected</p> <p>4 Problem, or initial condition</p> <p>5 Technique used</p> | <p>(13)
<i>Corning Glass</i></p> <p>1 Medfield, Mass. Instrument assembly</p> <p>5 6 workers assemble entire electrical hot plates with freedom to schedule work as a group so as to meet weekly objectives</p> | <p>(14)
<i>ATT</i></p> <p>1 Assembly of 'N2 carrier', Mass. Factory assembly. 3 components</p> <p>2 1973</p> <p>3 10 people</p> <p>4 Continuation of 'Work itself' programme application produced unsatisfactory results with individual job design</p> <p>5 Have own section chief, communicate among selves, formed interactive teams for total assembly of one component</p> |

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|---|--|------|--|------|---|
| 6 | <i>Human results</i> | 6 | Absenteeism dropped from 8% to 1% | 6 | 'Morale improved, absence no longer problem' |
| 7 | <i>Economic results</i> | 7 | Rejects dropped from 23% to 1% | 7 | Production improvement range 119% to 130%, workers receive 19% to 30% more dollars |
| 8 | <i>Reference(s)</i> | 8 | 'cited in <i>Work in America</i> , Report of a special Task Force to the Secretary of Health, Education and Welfare (US), December 1972, as: #24' | 8 | Personal communication M Gillette, AT and T UCLA, September 1974 |
| | | | | | |
| | | (15) | <i>Cummins Engine</i> | (16) | |
| 1 | <i>Establishment(s) or employee groups</i> | 1 | Charleston, SC. Automated block line assembly | 1 | <i>Medical Appliance Manufacturing Co</i>
Manufacturing and assembling |
| 2 | <i>Year initiated</i> | 2 | 1973 | 2 | 1973 |
| 3 | <i>Number of employees affected</i> | 3 | 7 workers man whole line | 3 | 60 workers |
| 5 | <i>Technique used</i> | 5 | Hold same job grade, man any station, 2 shift teams, do own testing | 5 | Divided into groups of from 5-20 persons with technology to match this team concept |
| 7 | <i>Economic results</i> | 7 | Good safety and quality | 8 | Glaser, op cit |
| 8 | <i>Reference(s)</i> | 8 | <i>Work in America</i> , op cit. | | |
| | | | | | |
| | | (17) | <i>Donnelly Corporation</i> | (18) | |
| 1 | <i>Establishment(s) or employee groups</i> | 1 | Holland, Michigan. Automotive mirror manufacturing. Nonunion. Machine operator | 1 | <i>Syntex Corporation</i>
Palo Alto sales office |
| 2 | <i>Year initiated</i> | 2 | 1966 | 2 | 1966 |
| 3 | <i>Number of employees affected</i> | 3 | 460 employees | | |
| 4 | <i>Problem, or initial condition</i> | 4 | Interest in carrying Scanlon plan participation further with new management ideas | 5 | Salesmen formed work teams where own standards and quotas were set |
| 5 | <i>Technique used</i> | 5 | Semi-autonomous work teams participate in department problem-solving meetings. Production teams show increase in decision-making, coordination, and influence | | |
| 6 | <i>Human results</i> | 6 | Satisfaction is mixed | 7 | Volumes sales increased by 116% to 20% over control |
| 7 | <i>Economic results</i> | 7 | Productivity in key division increased by 48%, salaries increased by 20% | 8 | <i>Work in America</i> op cit, #8. Rush, <i>Behavioral Science, Concepts and Management Application</i> , 1970, p 130 |
| 8 | <i>Reference(s)</i> | 8 | Iman, 'The Development of Participation by Semiautonomous Work Teams: The Case of Donnelly Mirrors', In Davis, and Cherns, (Eds), <i>Quality of Working Life, Vol. II</i> , Free Press, New York, 1975 | | |
| | | | | | |
| | | (19) | <i>Insurance Company</i> | (20) | |
| 1 | <i>Establishment(s) or employee groups</i> | 1 | Nonunion. One department | 1 | <i>Kaiser Aluminum Corporation</i>
Ravenswood, W.Va. Maintenance |
| 2 | <i>Year initiated</i> | 2 | 1956 | 2 | 1971 |
| 3 | <i>Number of employees affected</i> | 3 | 170 employees | 3 | 60 maintenance workers in reduction plant |
| 5 | <i>Technique used</i> | 5 | 1 department structurally changed for greater worker autonomy and another department changed for greater hierarchical control. Job content remained same | 5 | Time clocks removed, supervision virtually eliminated, workers decide what to be done and in what priority, cooperated with operators, worked days only |
| 6 | <i>Human results</i> | 6 | Satisfaction with company increased (sig) for autonomous programme and decreased (sig) for hierarchical programme. Job satisfaction decreased (sig) for hierarchical and did not increase for autonomous programme | 6 | Morale and pride of workmanship improved, tardiness eliminated, no grievances |
| 7 | <i>Economic results</i> | 7 | Productivity increased (sig) for both programmes during the experimental year | 7 | Maintenance costs down 5.5% |
| 8 | <i>Reference(s)</i> | 8 | Morse and Reimer, <i>Journal of Abnormal Social Psychology</i> , Vol 52, 1956, pp 120-9 | 8 | <i>Work in America</i> , op cit, #32 |

Experiments in Work Systems Design: Part I 29

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| | (21) | (22) |
| | <i>Texas Instruments</i> | <i>Operations Division, Bureau of Traffic</i> |
| 1 Establishment(s) or employee groups | 1 Dallas. Unskilled maintenance workers | 1 Ohio Department of Highways. 6 field construction crews |
| 2 Year initiated | 2 1967 | |
| 3 Number of employees affected | 3 120 maintenance workers | 4 Low productivity and poor quality of performance |
| 4 Problem, or initial condition | | 5 3 experimental crews established, each with different degree of self-determination of work schedules. Crews were unaware that they were participating in an experiment |
| 5 Technique used | 5 Organized into 19 member cleaning teams. Each member voice in planning, problem-solving, goal-setting, scheduling | 6 Data showed that as participation increased, so did morale |
| 6 Human results | 6 Turnover dropped from 100% to 10%. Personnel required dropped from 120 to 71 | 7 No significant change in productivity |
| 7 Economic results | 7 Cost savings \$103,000 annually between 1967-69. Cleanliness of buildings increased from 65% to 85% | 8 Powell and Schacter, <i>Academy of Management Journal</i> , 1971, pp 165-73 |
| 8 Reference(s) | 8 <i>Work in America</i> op cit, #23 | |
| | | |
| | (23) | (24) |
| | <i>Major Electrical Manufacturing Co</i> | <i>Proctor and Gamble</i> |
| 1 Establishment(s) or employee groups | 1 Mount Vernon, Indiana. Plastics manufacturing facility. Nonunion. Process operators | 1 Lima, Ohio. Process operator |
| 2 Year initiated | 2 1961-67 | |
| 3 Number of employees affected | 3 300 employees in 1961, about 700 employees in 1976 | 3 Process operators |
| 4 Problem or initial condition | 4 New plant opening provided opportunity to 'experiment' | 5 Work groups virtually complete control of the plant |
| 5 Technique used | 5 All employees salaried, no foremen, 5 levels based on responsibility with merit promotion, no plant security | 7 10%-50% less over-head and opportunity costs, (almost 10% Proctor and Gamble employees now work in open system plants) |
| 6 Human results | 6 'Highly participative' | |
| 7 Economic results | 7 'Highly productive.' Between 1961-67 productivity increased 11 times, personnel increased 3 times. The design has survived through a succession of 5 plant managers to 1976 | 8 Jenkins, <i>Job Power</i> , Doubleday, New York, 1973 |
| 8 Reference(s) | 8 Personnel communication with G E McCullough, Omega Management Consultants, Ann Arbor, Michigan in November 1976 | |
| | | |
| | (25) | (26) |
| | <i>Cryovac Division</i> | <i>General Foods</i> |
| 1 Establishment(s) or employee groups | 1 Plastic package manufacturing. 1969 new design, 1972 expanded. Process operator | 1 Pet Food plant. Topeka, Kansas. Nonunion, Process operator |
| 2 Year initiated | | 2 1971 |
| 3 Number of employees affected | 3 Process operators | 3 70 process operators |
| 4 Problem, or initial condition | 4 New plant | 4 New plant |
| 5 Technique used | 5 Mechanized and continuous process, workers acquire wide range of sophisticated process skills, work in semi-autonomous groups. Maintenance and operators under single supervisor | 5 Organized into autonomous groups responsible for a production process, pay based on number of jobs members can do |
| 6 Human results | | 6 Absenteeism 1% (90% of that with management approval, turnover 10% cf 15% GF average). 300% increase in outside education. Positive assessment by participants |

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|---|--|------|--|------|---|
| 7 | <i>Economic results</i> | 7 | Productivity increased 11%, another subprocess development obtained 40% increase, supervision reduced 50%, production rose 68%, personnel reduced 10%, 50% increase in run time capacity | 7 | Cost savings 20-40% better than other GF plants, rejects 80% less than normal in the business, manpower requirements reduced from 110 to 70, improved yields, minimized waste and avoidance of shutdown, safety improved (4.4% at Topeka, of 7.2% all GF) |
| 8 | <i>Reference(s)</i> | 8 | Davis and Cherns, (Eds), <i>Quality of Working Life, Vol II</i> , Free Press, New York, 1975 | 8 | <i>Work in America</i> , op cit |
| | | (27) | <i>Oil Refinery</i> | (28) | <i>Oil Refinery</i> |
| 1 | <i>Establishment(s) or employee groups</i> | 1 | Loading docks. Unionized | 1 | Motor pool. Unionized |
| 2 | <i>Year initiated</i> | 2 | 1968 | 2 | 1968 |
| 3 | <i>Number of employees affected</i> | 3 | About 5% of total refinery | 3 | 350 people |
| 4 | <i>Problem, or initial condition</i> | 4 | Interest in new management methodology | 5 | Four service oriented groups formed by function |
| 5 | <i>Technique used</i> | 5 | Maintenance and operators combined below 2nd level supervisors | 6 | Satisfaction with supervisor improved |
| 6 | <i>Human results</i> | 6 | Perception of organizational behaviour, and attitudes slightly better | 7 | Personnel reduced by 10%. 12% cost reduction |
| 7 | <i>Economic results</i> | 8 | McCullough, 'The effects of Changes in Organizational Structure: Demonstration Projects in an Oil Refinery', in Davis and Cherns, (Eds), <i>Quality of Working Life Cases</i> , Free Press, New York, 1975 | 8 | McCullough, <i>ibid</i> |
| 8 | <i>Reference(s)</i> | (29) | <i>Oil Refinery</i> | (30) | <i>Oil Refinery</i> |
| 1 | <i>Establishment(s) or employee groups</i> | 1 | Construction. Unionized | 1 | Refinery operators. Unionized |
| 2 | <i>Year initiated</i> | 2 | 1968-72. Disbanded | 2 | 1968 |
| 3 | <i>Number of employees affected</i> | 3 | About 5% of total refinery | 3 | Total mechanical division, 1,200 employees. 25% of employees in process division. Many salary workers, some hourly workers |
| 5 | <i>Technique used</i> | 5 | Two groups of 15 mixed craftsmen | 5 | 8 'operation speciality teams' comprised of maintenance, technical and operating people to operate particular refinery processes. These are fairly large organizational units under middle management jurisdiction |
| 6 | <i>Human results</i> | 6 | Perception of organizational behaviour improved | 6 | Satisfaction increased |
| 7 | <i>Economic results</i> | 7 | Cross craft activity increased | 7 | Maintenance costs decreased. Groups with hourly employees increased productivity 20-30%. Groups with salaried employees only, increased productivity 10% |
| 8 | <i>Reference(s)</i> | 8 | <i>Ibid</i> | 8 | <i>Ibid</i> . Personal communication December 1975 |
| | | (31) | <i>Monsanto</i> | (32) | <i>Nonlinear Systems</i> |
| 1 | <i>Establishment(s) or employee groups</i> | 1 | Textile division, Pensacola, Fla. Process operator | 1 | Del Mar, California. Electronics plant. Digital-voltmeters. Assembly operator |
| 2 | <i>Year initiated</i> | 2 | 1968 | 2 | 1960-70 |
| 3 | <i>Number of employees affected</i> | 3 | 50 chemical operators | 5 | 1961, grouped assembly workers rotated among reduced number of assembly stations; did own testing. 1971 - return to assembly line system |
| 5 | <i>Technique used</i> | 5 | Groups across shifts formed. Restructured some jobs and eliminated some, with automation | 6 | Evidently mixed results |
| 6 | <i>Human results</i> | 6 | Employee suggestions increased 300% | | |

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| <p>7 <i>Economic results</i></p> | <p>7 Waste dropped to zero</p> | <p>7 1960-65, production up 30%, customer complaints down 70%; owner claimed management was preoccupied with trying out participative techniques</p> |
| <p>8 <i>Reference(s)</i></p> | <p>8 <i>Work in America</i>, op cit, #15</p> | <p>8 <i>Business Week</i>, January 20, 1973, pp 98-100</p> |
| <p>1 <i>Establishment(s) or employee groups</i></p> | <p>(33)
<i>Corning</i>
1 Medfield, Mass. Glass works</p> | <p>(34)
<i>Military Aircraft Installation</i>
1 West Coast, maintenance operator, foremen of instrumental test facilities</p> |
| <p>2 <i>Year initiated</i></p> | <p>2 1965</p> | <p>2 1965</p> |
| <p>3 <i>Number of employees affected</i></p> | <p>5 Several socio-technical innovations in R and D department of one plant</p> | <p>3 150-200 workers, 11 foremen</p> |
| <p>5 <i>Technique used</i></p> | | <p>5 2 modifications of foreman's job:
(a) responsibility for whole product;
(b) responsibility for quality control of the phase of work his group did</p> |
| <p>6 <i>Human results</i></p> | | <p>6 <i>Change 1</i> resulted in perception of greater autonomy and skill for both supervisor and subordinates
<i>Change 2</i> resulted in perception of greater concern for subordinates and better relations with staff groups</p> |
| <p>7 <i>Economic results</i></p> | <p>7 Company gave this project widespread support and has implemented the ideas in other plants</p> | <p>7 Neither change reduced already low levels of absence, grievances or injuries</p> |
| <p>8 <i>Reference(s)</i></p> | <p>8 Beer and Huse, <i>Journal of Applied Behavioral Science</i>, January 1972</p> | <p>8 Davis and Valfer, 'Supervisor Job Design', <i>Ergonomics</i>, Vol 8, 1965</p> |
| <p>1 <i>Establishment(s) or employee groups</i></p> | <p>(35)
<i>Levi Strauss and Co</i>
1 Albuquerque, N.M. Garment factory</p> | <p>(36)
<i>Weldon Manufacturing Co</i>
1 Pyjama factory</p> |
| <p>2 <i>Year initiated</i></p> | <p>2 November 1974. Reinstated 1976</p> | <p>2 1960</p> |
| <p>3 <i>Number of employees affected</i></p> | <p>3 32 sewing machine operators in 'pants department'</p> | <p>3 500 employees</p> |
| <p>4 <i>Problem, or initial condition</i></p> | <p>4 Turnover 100 + % annually</p> | <p>4 Management succession</p> |
| <p>5 <i>Technique used</i></p> | <p>5 10 member Advisory Board (operators, management, personnel department) designed new system: operators could reject input from other departments. Control their own clock out procedure. Rotate among jobs/become multi-skilled. Do minor mechanical repairs. Operators paid higher base because of their additional skills/paid production bonus by team</p> | <p>5 Change to shorter assembly lines, and use of problem-solving groups in normal operations. Responsibility and influence increased for workers</p> |
| <p>6 <i>Human results</i></p> | | <p>6 Satisfaction unchanged</p> |
| <p>7 <i>Economic results</i></p> | <p>7 Over a 3 month period attendance better than the rest of the plant. Average monthly turnover 6.6% compared with plant 8.6%. Operators' earnings increased 15c per hour compared with 8c in remainder of the plant</p> | <p>7 Absences down from 6% to 3%. Turnover decreased, manufacturing defects down by 39%; customer returns down 57%; performance up from 81% to 119%</p> |
| <p>8 <i>Reference(s)</i></p> | <p>8 'Searching for a Better Way to Work,' <i>Saddlemans Review</i>, Vol 19, No 2, Summer 1975, pp 3-7</p> | <p>8 Marrow, Bowers and Seashore, <i>Management by Participation</i>, Harper and Row, New York, 1967</p> |
| <p>1 <i>Establishment(s) or employee groups</i></p> | <p>(37)
1 Assembly department producing small plastic medical appliances</p> | <p>(38)
<i>Harwood Manufacturing Co</i>
1 Pyjama factory. Marion, Virginia</p> |
| <p>2 <i>Year initiated</i></p> | <p>2 1954</p> | <p>2 1947</p> |
| <p>3 <i>Number of employees affected</i></p> | | <p>3 600 employees</p> |

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| <p>5 <i>Technique used</i></p> | <p>5 2 designs:
(a) conveyor belt eliminated, and employees worked as a team rotating among 9 work stations;
(b) industrial jobs combined all 9 stations</p> | <p>5 2 experiments with packing work:
(a) control group - no participation in work changes. Experimental group - total participation in work change;
(b) one group: first used no participation, then total participation in work changes (acted as own control)</p> |
| <p>6 <i>Human results</i></p> | <p>6 Employees said they would not return to assembly line conveyor</p> | <p>7 Both experiments resulted in increase for total participation to 70 units per hour compared with 50 units per hour for control</p> |
| <p>7 <i>Economic results</i></p> | <p>7 Design 1 productivity fell from 100 to 89%; quality improved some. Design 2 productivity held at 100%, quality improved considerably</p> | <p>8 Coch and French, 'Overcoming Resistance to Change', <i>Human Relations</i>, Vol 1, 1948</p> |
| <p>8 <i>Reference(s)</i></p> | <p>8 Davis and Canter, 'Job Design Research', <i>Journal of Industrial Engineering</i>, 1956</p> | |
| | <p>(39)
<i>General Electric</i></p> | <p>(40)
<i>American Telephone</i></p> |
| <p>1 <i>Establishment(s) or employee groups</i></p> | <p>1 Aircraft engine manufacturing. Lynn, Mass. Unionized</p> | <p>1 Central office engineering department for Main, NH and Vermont</p> |
| <p>2 <i>Year initiated</i></p> | <p>2 Begun 1968, discontinued 1973</p> | <p>2 April 1975</p> |
| <p>3 <i>Number of employees affected</i></p> | <p>3 Initially 21, later 63 operators</p> | <p>3 80 employees in line and staff</p> |
| <p>4 <i>Problem, or initial condition</i></p> | <p>4 Low efficiency in shop using numerically controlled lathes. High number of grievances</p> | <p>4 Poor information flow, redundant functions, large labour force, and work 'fused' too high</p> |
| <p>5 <i>Technique used</i></p> | <p>5 A single unit of automatic lathe operators worked without direct supervision. Shift one laps over were installed for continuity. Flexible starting times were permitted. Workers assumed responsibility for interface and support functions. They began doing some of their own programming, scheduling, and fixture design. Received 10% bonus pay for the experiment</p> | <p>5 Reduced 9 separate functions to 4. Provided feedback to the engineers and clerks, and provided direct relationships to client systems</p> |
| <p>6 <i>Human results</i></p> | <p>6 Within 6 months, attitudes and individual involvement had improved</p> | <p>7 Reduced 22% of 2nd level management jobs. Reduced 50% 3rd level, and the 4th level management jobs. Cost savings - \$250,000 annually</p> |
| <p>7 <i>Economic results</i></p> | <p>7 After 2 years, continued scrap and rework declines were reported, as well as gains in product quality</p> | <p>8 Personal communication. Bruce Duf-fany, Human Resources Department, American Telephones.
Also - ATT film on 'Work Design', narrated by Tom Clark</p> |
| <p>8 <i>Reference(s)</i></p> | <p>8 Fadern, 'Fitting Computer-Aided Technology to Workplace Requirements'. A paper presented to 13th meeting of Numerical Control Society, March, 1976, Cincinnati</p> | |
| | <p>(41)
<i>Rockwell International, Rockwell Standard Division</i></p> | <p>(42)
<i>Jamestown Labor Management Project</i></p> |
| <p>1 <i>Establishment(s) or employee groups</i></p> | <p>1 New installation. Battle Creek, Michigan. Manufacturing NC machines. Unionized</p> | <p>1 Maddox Table Co. Furniture manufacturing. Unionized (United Furniture Workers of America). 125 employees</p> |
| <p>2 <i>Year initiated</i></p> | <p>2 1975</p> | <p>2 Early 1975 - ran 3 months.</p> |
| <p>3 <i>Number of employees affected</i></p> | <p>3 Work force of 150. Machine operators and assembly operators</p> | <p>3 Group of 11 workers in Rough Mill Department</p> |
| <p>4 <i>Problem, or initial condition</i></p> | <p>5 Work teams assigned general task, can divide labour. Interchangeability of jobs, participation for production standards, resolve work problems at lowest level</p> | <p>4 Union requested a project to improve the work and productivity</p> |
| <p>5 <i>Technique used</i></p> | | <p>5 Operators, tailers and helpers on 3 key machines (ripsaws) plus the foreman were trained in recognizing quality of incoming wood, to made decisions on cutting wood, and were given training in layout and organization. Old job classes were retained</p> |
| <p>6 <i>Human results</i></p> | | <p>6 Cooperative team work did not result. The prior bonus system, based on job class, compounded problems in working together</p> |

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| <p>7 Economic results</p> <p>8 Reference(s)</p> | <p>8 <i>Los Angeles Times</i>, October 25 1974, Part VI, p 15
Personal communication, D. Ephlin</p> | <p>7 Yield did not increase</p> <p>8 Personal communication with James Schmatz, Labor-Management Committee Coordinator, Jamestown, NY August, 1976</p> |
| (43) | | |
| <p>1 Establishment(s) or employee groups</p> <p>2 Year initiated</p> <p>3 Number of employees affected</p> <p>4 Problem, or initial condition</p> <p>5 Technique used</p> <p>6 Human results</p> | <p><i>Jamestown Labor-Management Project</i></p> <p>1 Falconer Plate Glass Co. Unionized (Glass and Ceramic Workers Union). Glass processing. 250 employees</p> <p>2 Late 1975 – six month experiment</p> <p>3 40 employees in tempering department</p> <p>4 Desire to reduce scrap and institute gain sharing system</p> <p>5 10 training sessions conducted for employees in tempering and undertaking to improve information flow between them. Resulted in better understanding of each group for the remnants of the other</p> <p>6 Number of grievances reduced. Union demands gain sharing programme be spread wider</p> | <p>(44)</p> <p><i>Jamestown Labor-Management Project</i></p> <p>1 AMSCO manufacturing. Stainless steel hospital equipment. Unionized (IAM). Job shop. 250 employees</p> <p>2 Early 1976</p> <p>3 13 workers in polishing department</p> <p>4 An experiment under the Jamestown project to improve productivity and quality of working life</p> <p>5 Voluntary changes in group and individual activities. Foreman became facilitator/trainer, members decided to do own scheduling. (2 employees chose not to participate)</p> <p>6 Labor Management Committee will continue with experiments in other areas of the plant. Although employees had been given a \$10 bonus for participating they claim willingness to continue irrespective. Management faced a problem of exploiting the groups' willingness to take on extra work – this has been resisted</p> <p>7 Substantial increase in productivity (150%+)</p> <p>8 Personal communication with James Schmatz, Labor Management Committee Coordinator, August, 1976</p> |
| <p>7 Economic results</p> <p>8 Reference(s)</p> | <p>7 Scrap reductions result in gain sharing to employees of up to \$6,000</p> <p>8 Personal communication with James Schmatz, Labor Management Coordinator, August 1976</p> | <p>7 Substantial increase in productivity (150%+)</p> <p>8 Personal communication with James Schmatz, Labor Management Committee Coordinator, August, 1976</p> |
| (45) | | |
| <p>1 Establishment(s) or employee groups</p> <p>2 Year initiated</p> <p>3 Number of employees affected</p> <p>4 Problem, or initial condition</p> <p>5 Technique used</p> <p>6 Human results</p> <p>7 Economic results</p> | <p><i>Insurance Company</i></p> <p>1 Home Office. Nonunion.</p> <p>2 1975</p> <p>3 75 clerical and semi-professional white-collar employees in 3 support departments</p> <p>4 Company interested in socio-technical design to improve quality of working life and productivity</p> <p>5 Semi-autonomous groups within the 3 departments were formed, based on an analysis of technical requirements. These groups contained a wide mix of jobs with multi-skill capabilities</p> <p>6 Team members prefer the new working arrangements over the old ones. They favour the new promotional opportunities afforded by the multiple skill arrangements</p> <p>7 Productivity increases range from 10% to 400% over 6-8 month period. Much improvement claimed in the use of the more flexible arrangements</p> | <p>(46)</p> <p><i>Sheet Plastics Factory</i></p> <p>1 Plant manufacturing packaging plastics in Merced, CA. Opened July, 1973, Nonunion</p> <p>2 Design implemented 1975</p> <p>3 Total work force (44-50 employees) involved</p> <p>4 Production goals not met</p> <p>5 Socio-technical analysis used to design self-managed teams. 1 team of 11 employees operate on each of 3 shifts. Members participate in setting production goals. Responsible for own maintenance, housekeeping functions, and quality control. Pay based on skills attained in compound manufacturing extruding machine operation and maintenance</p> <p>6 Increased skills (and pay). Turnover decreased. Informally, employees more satisfied. (No layoffs, despite market decline)</p> <p>7 Productivity increases; decreased waste. Increased quality</p> |

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- 8 *Reference(s)* 8 Personal communication: B. Yost, Organizational Development Department, Occidental Life Insurance Co, Los Angeles
Taylor, 'Employee Participation in Socio Technical Work System Design: A White Collar Example,' Paper presented to Annual Meeting Academy of Management, Kansas City, August 1976
- 8 Speech delivered to Center for Quality of Working Life/HR Short Course, UCLA. Jarry Persinger and Carl A Bramlette, September 1976
- CANADA**
- (47)
- Northern Electric Co*
- 1 *Establishment(s) or employee groups* 1 Advanced Devices Center (subsequently renamed Micro Systems International Ltd) Ottawa
- 2 *Year initiated* 2 1964-1966
- 3 *Number of employees affected* 3
- 4 *Problem, or initial condition* 4 Move from Montreal to new site, and doubling work force
- 5 *Technique used* 5 Change in structure to open, team organization. Space, size and quality was an important aspect as it focused on professional and managerial personnel with variety of communication patterns
- 6 *Human results* 6 25% participants showed positive response
- 7 *Economic results* 7 Early gains in performance
- 8 *Reference(s)* 8 Gabarro, and Lorsch, 'Northern Electric Company,' Intercollegiate Case Clearing House, Harvard Business School, 1968, 14 pp
Walton, 'Innovative Restructuring of Work' in Jerome Roscow (Ed), *The Worker and the Job*, Prentice-Hall, Englewood Cliffs, NJ, 1974
- (48)
- Aluminum Co of Canada Ltd*
- 1 *Establishment(s) or employee groups* 1 Aluminum Casting Arvida, Quebec. Unionized. Process operator.
- 2 *Year initiated* 2 October 1970 - November 1971
- 3 *Number of employees affected* 3 47 hourly workers
- 4 *Problem, or initial condition* 4 Fluctuating production load made supervision very difficult
- 5 *Technique used* 5 Semi-autonomous work crews; interchangeability of tasks; role enlargement. Foreman's role focused on planning and coordinating for the crews, union, and management. Suspended contract under a sheltered experiment for 1 year
- 6 *Human results* 6 Interviews and survey questionnaire by both union and management showed high satisfaction and ability to meet emergencies
- 7 *Economic results* 7 Production increased 7-12%, cost reduced 11%
- 8 *Reference(s)* 8 Taylor, et al, op cit, #8002
Archer, 'Achieving Joint Organizational, Technical, and Personal Needs,' in Davis and Cherns (Eds), *Quality of Working Life, Vol II*, Free Press, New York, 1975
- (49)
- Air Canada*
- 1 *Establishment(s) or employee groups* 1 Maintenance crew. Replacing windows on DC-8s. Unionized
- 2 *Year initiated* 2 March 1974
- 3 *Number of employees affected* 3 Work group of 8 mechanics
- 4 *Problem, or initial condition* 4 Low productivity, high supervisory costs
- 5 *Technique used* 5 Leadhand and 7 mechanics have multiple skills. The group is ordinarily divided into 2 teams - 1 removes and replaces the windows, and the other repairs or overhauls them
- 6 *Human results* 6 After 12 months, improvement in employee feelings about the work, about improved authority, about achievement and growth, relations with supervisor, and the use of systems and methods
- 7 *Economic results* 7 Manhours expended per window, improved 100%; supervisory time on this work reduced from 25% to 5%
- 8 *Reference(s)* 8 Chartrand, 'The Impact of Organization on Labor Relations at Air Canada', *The Canadian Personnel*, Vol 23, 1976, pp 22-6