Industrial Engineering and Human Relations

By M. T. DAVIS

THE war has pointed out, as never before, the need for more emphasis on human relations in industry. As a consequence, we have seen a number of new developments in industrial relations within the past few years. We hear of a shipyard that employs a specialist in human relations whose sole function is to interview and pacify employees who want to quit. Other companies have invested large amounts of time and money in orientation programs for their new employees. Another company employs counsellors for every 200 employees, whose only duty is to make friends of workers and listen to their personal stories. Some of this is surface progress and some of it is real. But everywhere there is the indication that industry must take more interest in its employees as individuals.

It is easy to see why this might be desirable as an aid to production management or to personnel departments. But it is more difficult to see how it is related to the more technical field of industrial engineering. Yet method improvements, wage incentives and cost reducing plans are all dependent upon human beings for their success. The human factor is nearly always present and crops up in the most unexpected way to ruin otherwise perfect plans. It is therefore inevitable that industrial engineers sooner or later will need to develop human relation techniques to help them solve problems in their own field.

The science of industrial engineering, as it stands today, is primarily concerned with the physical facts of the situation. Textbooks on the subject cover time and motion study, cost reduction, plant layout, etc., and describe techniques for the analysis and application of such factual knowledge. Because of the application of the scientific method to these aspects of management, great progress is being made. But actual accomplishment is falling short of potential progress because the human factors so often are the limiting factors of a situation. What is needed is a technique for analyzing and applying the human facts of every situation as a part of every industrial engineering study. Such a technique should indicate what human limitations there are to a proposal and how to introduce a change with the least possible friction and the greatest chance of success.

You may reply: "But this is not the job of an industrial engineer; it is the job of line management, or the industrial relations department." Yes, I agree, perhaps it is, but the trouble is that line management is too busy with other things to do any detailed human relations planning, and the industrial relations people are generally swamped with the broader problems of wage administration, union negotiations, employment, morale building, etc. Furthermore industrial engineering and industrial relations are both so specialized that they work independently and have little interest in making a success of the other department's plans. In fact, in some companies there is considerable difference of opinion, sponsored by line management, to bring out two opposing points of view.

The result of this situation is that industrial engineering recommendations are generally made without the benefit of detailed human relations planning, and are either opposed, *in toto,* by the industrial relations department, or are approved by management. Any human relations problems are then left to line supervision to solve as they arise. Furthermore, many line supervisors resent having someone from the outside make plans for their departments, and, if they have not been taken in on the plan from the start, will make no effort to insure its success.

What the industrial engineering department usually needs is good human relations counsel, from the start to the finish, for each study it makes. It needs the human relations data on the situation and advice on how to modify its proposal so as to utilize the human factors to the best advantage. In general, it needs the following type of information:

1. Who are the people involved in the proposed change? What type of employees are they?

2. What has been their feeling toward changes in the past? How will the traditions of their group be affected by the proposal? Will they feel they are getting a square deal? Have past experiences developed a cynical attitude toward all company proposals?

3. Who are the leaders of the group affected? How can they be sold on the proposal?

4. What is the immediate supervisor's probable reaction? Are his ideas incorporated in the proposal? How can he be brought into the plan so that he feels favorably toward it? Can he be given the major credit for the plan?

5. What is the attitude of the union toward such a proposal? How is the union contract involved?

6. Will the proposal require that men be laid off or demoted? Can satisfactory transfers be arranged?

7. Will wage rates and incentive rates be fairly adjusted as part of the change? Will men be asked to take more responsibility or do more work without extra compensation? Will men be asked to work against their own interests?

8. How will the proposal affect persons in other departments in the plant?

9. Will the proposal take all the responsibility and skill away from certain jobs? If so, will present employees lose prestige with their fellow workers? Will it be possible to keep present employees satisfied under the new conditions?

10. Have the workers involved had ample opportunity to express their views regarding improvements included in the proposal? Have their ideas been given honest consideration and credit?

11. Do employees trust the data of the industrial engineers? Are they convinced performance standards are fairly set?

12. How are lines of promotion affected by the proposal? Will some workers be cut out of advancement they have worked toward under the present set-up?

13. What kind of appeal would be most successful in getting acceptance from the workers? Who should introduce and sell the plan to them?

14. What is the proper timing for introducing the proposed plan? Are the workers or supervisors temporarily upset about something? When should the plan be installed?

15. What are the long-time human relations effects of the proposal? Can management honestly fulfill the commitments made? Are there other changes which will follow?

We can all remember cases in our own experience where failure to consider such factors has led to the downfall of plans for improvement. The following examples, although in part hypothetical, were suggested by actual experience and serve to illustrate the point:

(a.) An industrial engineering plan called for the transfer of certain grinding machines from the machine shop to the foundry cleaning room. The change was expected to streamline the flow of material and eliminate a bottleneck in the material's handling system. Shortly after the change, the number of castings per day began to fall off despite the fact that the grinders were working on piece rate and no change in equipment or method had been made. The anticipated benefits were completely offset by the lowered production of the grinders.

Investigation showed that the grinders were upset because they had been moved into the cleaning room along with the foundry laborers. Since it was a generally accepted fact that the foundry laborers were lower than machine shop workers in the social scale, the grinder's standing in the factory social organization had been lowered. No amount of persuasion could convince them that it made no difference where they worked as long as their pay remained the same. To them, they had lost prestige. Finally the entire plan was abandoned and the machines moved back to their former place before production could be brought back to normal.

(b.) Another plan called for the rearrangement of the equipment in a plating room to eliminate one of the dipping processes. From the start it was opposed by the foreman of the plating department. Trouble developed with the improved process and things grew from bad to worse. Finally it was discovered that the foreman had made the same suggestion for improvement a number of years before, but had been turned down by a former plant manager. It was only after the present plant manager had been apprised of this fact and the foreman given public recognition for his idea that the new plan began to work properly.

(c.) On the other side of the picture there was the case of the industrial engineering department which was responsible for making all the job evaluations in a steel mill. From the start the system of job evaluation was opposed by the department superintendents and foremen. The job evaluation technique was complicated and difficult to understand. The job evaluations developed by the industrial engineering department seemed arbitrary, and industrial engineering recommendations on rates were generally questioned by department supervisors.

The solution to this problem was to modify and simplify the job evaluation system so as to bring line supervisors' opinions into the decisions. Ranking scales for each factor in the evaluation were developed so that foremen could quickly make and check evaluations against their own background of experience. None of the accuracy of the evaluations was sacrificed, however, and the basic principles set up by the industrial engineers were in use. The result was that bickering stopped and the industrial engineering department was able to check its evaluations and profit from the broad experiences of the line supervisors.

It is obvious that a serious consideration of the human factors, at the time the above plans were developed, would have made it possible to eliminate some of the mistakes made in their application.

It is not inconceivable that at some future date a human relations analysis will be an integral part of every industrial engineering study made. The industrial engineer's report and recommendations may include a section on the human aspects of the plan and a recommended human relations procedure for its installation.

Just how the industrial engineering department will be organized to obtain this data will depend, of course, upon individual circumstances. It may be that someone in the industrial relations division would be qualified, or someone from line supervision, or someone from the industrial engineering department itself. The important thing, however, will be to obtain sound advice from persons who know the employees affected by the plan and their probable reaction to it.

All this will be worked out in the future as industrial engineers appreciate more fully their need for human relations planning. It is inevitable, however, that considerable progress will be made in this field—with surprising results. Industry is slowly learning something about human relations, and industrial engineering cannot afford to be left behind.

Radio Communications

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foot transmission line terminating in the headquarters garage building permits the mobile unit in the garage to be connected with the fixed antenna. Ordinarily, when the car is away from its headquarters, it operates as a mobile unit, using the short center-loaded antenna mounted on the car; however, when it is desired to increase its range or when the car is at headquarters, the short antenna is disconnected and the car set is plugged into the transmission line, connecting it with the fixed antenna. The equipment for doing this has been simplified so that the change-over can be made in 10 or 15 seconds by an operator with a "Restricted Radiotelephone Permit." The 100-foot fixed antenna has not been installed long enough to determine its maximum range; however, during recent tests satisfactory contacts were made with 50-watt units 140 miles away. It appears that dependable two-way communication is possible at all times with other 15-watt mobile units operating within a 30-mile radius.

50-WATT PORTABLE MOBILE UNIT

This equipment comprises two transmitting and receiving units (operating on 2292 and 33,060 kilocycles), housed in waterproof boxes, mounted on a trailer. It is designed to operate on 120-volt, 50- or 60-cycle alternating current power supply through a 50-foot extension