**Progressive Manufacture at Ford**

* What are the organizational design features of Ford’s production plant in Michigan?
* What are the advantages and disadvantages of Ford’s production model?

In 1913, Henry Ford opened the Highland Park plant to produce the Model T car. In doing so, he changed forever the way complex products like cars are made, and the new technology of “progressive manufacture” (Ford’s term), or mass production, was born.

Before Ford introduced mass production, most cars were manufactured by craftswork. A team of workers—a skilled mechanic and a few helpers—performed all the operations necessary to make the product. Individual craftsworkers in the automobile and other industries have the skills to deal with unexpected situations as they arise during the manufacturing process. They can modify misaligned parts so that they fit together snugly, and they can follow specifications and create small batches of a range of products. Because craftswork relies on workers’ skills and expertise, it is a costly and slow method of manufacturing. In searching for new ways to improve the efficiency of manufacturing, Ford developed the process of progressive manufacture. Ford outlined three principles of progressive manufacture:

1. Work should be delivered to the worker; the worker should not have to find the work. At the Highland Park plant in Michigan, a mechanized, moving conveyor belt brought cars to the workers. Workers did not move past a stationary line of cars under assembly.

2. Work should proceed in an orderly and specific sequence so each task builds on the task that precedes it. At Highland Park, the implementation of this idea fell to managers, who worked out the most efficient sequence of tasks and coordinated them with the speed of the conveyor belt.

3. Individual tasks should be broken down into their simplest components to increase specialization and create an efficient division of labor. The assembly of a taillight, for example, might be broken into two separate tasks to be performed all day long by two different workers. One person puts lightbulbs into a reflective panel; the other person screws a red lens onto the reflective panel.

As a result of this new work system, by 1914 Ford plants employed 15,000 workers but only 255 supervisors (not including top management) to oversee them. The ratio of workers to supervisors was 58 to 1. This very wide span of control was possible because the sequence and pacing of the work were not directed by the supervisors but were controlled by work programming and the speed of the production line. The mass production system helped Ford control many workers with a relatively small number of supervisors, but it also created a tall hierarchy. The hierarchy at a typical Ford plant had six levels, reflecting the fact that management’s major preoccupation was the vertical communication of information to top management, which controlled decision making for the whole plant.

The introduction of mass production technology to auto making was only one of Henry Ford’s technological manufacturing innovations. Another was the use of interchangeable parts. When parts are interchangeable,

the components from various suppliers fit together; they do not need to be altered to fit during the assembly process. With the old craftswork method of production, a high level of worker competence was needed to fit together the components provided by different manufacturers, which often differed in size or quality. Ford insisted that component manufacturers follow detailed specifications so that parts needed no remachining and his relatively unskilled work force would be able to assemble them easily. Eventually, the desire to control

the quality of inputs led Ford to embark on a massive program of vertical integration. Ford mined iron ore in its mines in Upper Michigan and transported the ore in a fleet of Ford-owned barges to Ford’s steel plants in Detroit, where it was smelted, rolled, and stamped into standard body parts.

As a result of these technological innovations in manufacturing, by the early 1920s Henry Ford’s organization was making over two million cars a year. Because of his efficient manufacturing methods, Ford reduced the price of a car by two-thirds. This low-price advantage, in turn, created a mass market for his product. Clearly, as measured by standards of technical efficiency and the ability to satisfy external stakeholders such as customers, Ford Motor was a very effective organization.

Inside the factories, however, the picture was not so rosy. Workers hated their work. Ford managers responded to their discontent with repressive supervision. Workers were watched constantly. They were not allowed to talk on the production line, and their behavior both in the plant and outside was closely monitored (for example, they were not allowed to drink alcohol, even when they were not working). Supervisors could instantly fire workers who disobeyed any rules. So repressive were conditions that by 1914 so many workers had been fired or had quit that 500 new workers had to be hired each day to keep the work force at 15,000. Clearly, the new technology of mass production was imposing severe demands on individual workers.