

## Henry Ford on Continuous Improvement

Last month, the Ford Motor Company celebrated its 100<sup>th</sup> anniversary, providing an occasion to revisit this article that appeared in Lean Directions last year --

Japanese developers of the manufacturing methods known now as lean acknowledged Henry Ford as an inspiration, though they knew him only through his books. The following excerpts from Henry Ford's **My Life and Work** show how close today's efforts are to Ford's transformation of the automobile business.

### **Continuous improvement**

Hardly a week passes without some improvement being made somewhere in machine or process...The factory keeps no record of experiments. The foremen and the superintendents remember what has been done. If a certain method has formerly been tried and failed, somebody will remember it--but I am not particularly anxious for the men to remember what someone else has tried to do in the past, for then we might quickly accumulate far too many things that could not be done. That is one of the troubles with extensive records. If you keep on recording all of your failures you will shortly have a list showing that there is nothing left for you to try--whereas it by no means follows because one man has failed in a certain method that another man will not succeed.

They told us we could not cast gray iron by our endless chain method and I believe there is a record of failures. But we are doing it. The man who carried through our work either did not know or paid no attention to the previous figures.

### **Eliminate unnecessary steps**

Likewise we were told that it was out of the question to pour the hot iron directly from the blast furnace into mould. The usual method is to run the iron into pigs, let them season for a time, and then remelt them for casting. But at the River Rouge plant we are casting directly from cupolas that are filled from the blast furnaces. Then, too, a record of failures--particularly if it is a dignified and well-authenticated record--deters a young man from trying. We get some of our best results from letting fools rush in where angels fear to tread.

### **Not being satisfied with the status quo**

None of our men are "experts." We have most unfortunately found it necessary to get rid of a man as soon as he thinks himself an expert--because no one ever considers himself expert if he really knows his job. A man who knows a job sees so much more to be done than he has done, that he is always pressing forward and never gives up an instant of thought to how good and how efficient he is. Thinking always ahead, thinking always of trying to do more, brings a state of mind in which nothing is impossible. The moment one gets into the "expert" state of mind a great number of things become impossible.

### **Eliminate waste**

Not a single operation is ever considered as being done in the best or cheapest way. At that, only about ten per cent of our tools are special, the others are regular machines adjusted to the particular job. And they are placed almost side by side. We put more machinery per square foot of floor space than any other factory in the world--every foot of space not used carries an overhead expense. We want none of that waste.

Experiments are constantly going on in the utilization of scrap. In one of the stamping operations six-inch circles of sheet metal are cut out. These formerly went into scrap. The waste worried the men. They worked to find uses for the discs. They found that the plates were just the right size and shape to stamp

into radiator caps but the metal was not thick enough. They tried a double thickness of plates, with the result that they made a cap which tests proved to be stronger than one made out of a single sheet of metal. We get 150,000 of those discs a day. We have now found a use for about 20,000 a day and expect to find further uses for the remainder.

### **Try new processes**

We experimented with bolts and produced a special bolt made on what is called an upsetting machine with a rolled thread that was stronger than any bolt we could buy, although in its making was used only about one third of the material that the outside manufacturers used. The saving on one style of bolt alone amounted to half a million dollars a year.

### **Recycle waste products**

We use a great deal of coal. Part of it goes for steam purposes. Another part goes to the by-product coke ovens which we have established at the River Rouge plant. Coke moves on from the ovens by mechanical transmission to the blast furnaces. The low volatile gases from the blast furnaces are piped to the power plant boilers where they are joined by the sawdust and the shavings from the body plant and in addition the coke "breeze" (the dust in the making of coke) is now also being utilized for stoking. The steam power plant is thus fired almost exclusively from what would otherwise be waste products.

Among the by-products of the coke ovens is a gas. It is piped both to the Rouge and Highland Park plants where it is used for heat-treat purposes, for the enameling ovens, for the car ovens, and the like. We formerly used to buy this gas. The ammonium sulfate is used for fertilizer. The benzol is a motor fuel. The small sizes of coke, not suitable for the blast furnaces are sold to the employees--delivered free into their homes at much less than the ordinary market price.

### **Target costing**

Our policy is to reduce the price, extend the operations, and improve the article. You will notice that the reduction of price comes first. We have never considered any costs as fixed. Therefore we first reduce the price to a point where we believe more sales will result. Then we go ahead and try to make the price. We do not bother about the costs. The new price forces the costs down.

The more usual way is to take the costs and then determine the price and although that method may be scientific in the narrow sense, it is not scientific in the broad sense, because what earthly use is it to know the cost if it tells you you cannot manufacture at a price at which the article can be sold? But more to the point is the fact that, although one may calculate what a cost is, and of course all of our costs are carefully calculated, no one knows what a cost ought to be. One of the ways of discovering what a cost ought to be is to name a price so low it forces everybody in the place to the highest point of efficiency. The low price makes everybody dig for profits. We make more discoveries concerning manufacturing and selling under this forced method than by any method of leisurely investigation.

Ford, Henry. 1922. My Life and Work. Garden City, New York: Doubleday. Reprinted 1987 by Ayer Company, Publishers, Salem New Hampshire.

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