Iron and Steel Industry Progress Forecast for Next Decade

by Charles F. Goodeve

IN 10 YEARS' time, the blast furnace will not be seriously challenged. It is highly efficient thermally, using 95 pct of its heat usefully, and it has a high labor productivity. However, it has its weaknesses and these should be regarded as further challenges. For instance, it is very particular about its food, demanding high quality coal which must be predigested into coke, and demanding an equally predigested or prepared burden. Technicians should continue to look for some other process that is not quite so particular this way. The blast furnace gives a product that has still some way to go before it is steel. It replaces the oxygen of the ore by carbon; to remove this carbon in the open hearth furnace takes a long time. The blast furnace's third weakness still remains, chemical reactions which take seconds in a laboratory need 12 hr in the furnace.

While the blast furnace will still dominate the iron and steel industry in 10 years' time, there will be changes in detail. Thus, the engineering difficulties associated with blowing by gas turbines should be overcome within five years, and the steam boiler will then be necessary. A more uniform method for bosh cooling will replace the common but illogical spot method, and cooling under the hearth is probable. In 10 years' time, the size of the furnace may increase a little. The method of putting air in may change slightly, because no one knows exactly how the burden is supported inside the furnace.

The position of the open hearth furnace is rather different from that of the blast furnace. It can hardly be called efficient thermally, but it will still be in the picture in 10 years' time, although it is unlikely to be so dominating unless it changes its ways. Its chemical reactions are slow, like those in the blast furnace, and some economical method of stirring must be found. Oxygen will stir the bath, but it has disadvantages. To be reasonably efficient the open hearth furnace must be large, but in a batch process such as this, if large quantities are produced at once, soaking pit problems result.

One challenge to the open hearth furnace is from the converter. Rapid progress is being made on the continent, particularly with the use of bottom, side, or top blowing with oxygen to reduce the nitrogen content of the steel. Prejudice against the converter exists in Great Britain and America, but that its possibilities are recognized in the U. S. is shown by the new interest Americans are taking in the Turbo-hearth. This is essentially a side blown basic con-

verter, but it is important to give the old dog a new name. Challenge from the converter is a real one.

Rolling Mills

There is no indication of a major change in primary mills as far as the heavy steel industry is concerned. There will be great improvements in control, however, and by the use of position control, rapid operation of the screwdown gear is now possible giving precision and much faster operation.

Continuous casting is now firmly installed in all parts of the world on an entirely reliable basis. The problems of quality of product and reliability of operation have been successfully overcome. In 10 years' time, a large proportion of the more expensive steels will be produced by continuous casting and will not be rolled in a primary mill.

In the secondary mill, it is to be hoped that the witchcraft of roll design will become a science. Scientists are now getting to know what happens when rolling squares and rounds, but not sections. The extrusion methods of the nonferrous industry may find a still bigger place in steel manufacture.

Equipment for Industry

Methods of control are best considered by relating them to: A—the operator of the machine, and B—the manager controlling his plant.

The modern crane cab is an example of design based on the operator's needs, but it is remarkable that foot operated controls have developed so slowly. Use of hydraulics is increasing because hydraulic controls have low inertia and give positive positioning.

The manager is entering the white tape era in which information comes in on a tape and is analyzed electrically. In the future, orders, wages, sales, and general records will be handled by these electronic brains with a minimum of labor.

Modernization of transport is long overdue, and with redesign of highways, there will be cheaper delivery of products. The railways will have to meet this competition and must become much more efficient.

Statistics showing improvements in fuel efficiency since the war are not inspiring, particularly those showing the efficiency with which fuel is used in soaking pits. Steel at red heat has, of course, a low conductivity, and the principle of induction heating for topping up the heat of blooms and billets is a good one.

The future of oxygen in steelmaking depends on getting rid of fumes. There must be active steps to eliminate smoke, dust, and fume from all sources but one cannot be very optimistic about making more than a modest reduction in the emission of oxides of sulphur.

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