

The performance of the United States industry is even more significant in light of differences in the structure of the costs it faces. This was forcefully pointed out by Francis A. Muller, Economic Affairs Officer of the United Nations Economic Commission for Europe, in a letter to this author. He states:

The economic structure of the steel industry in the United States and the rest of the world is significantly different:

	United States %	ECSC %
Employment costs	40	20
Energy, materials, supplies	45	75
Investment and interest	10	5
Miscellaneous	5	5

It is quite natural that in the United States the main innovation effort is made toward improving labor productivity, and in the rest of the world toward improving raw material and energy savings. A recent survey of labor productivity comparisons in the iron and steel industry (U.N. Report Steel/304) has shown that labor productivity in the United States is more than twice as high as in European countries. This is explained mainly by *innovation* in operative efficiency of the steel industry as a whole.

A rough comparison of energy and labor input for one ton of cold rolled sheet at the various stages of production is shown in the following table:

	Energy %	Manpower %
Blast furnace	20	15
Steelmaking	45	20
Hot rolling	15	45
Cold rolling	20	20

It is quite natural from the economic point of view that more research and development effort is spent in the United States on the labor-intensive rolling stages, and more research effort is spent in other countries on the energy-intensive iron and steelmaking improvements.

From the point of view of quality of the steel products, it is also well known, that it is in the rolling area where the bulk of the problems arise and have to be tackled. (It is worthwhile pointing out that a great many technical terms describing rolling practices and steel quality defects exist only as English expressions and are used as such in other languages, awaiting adequate translations.) It is especially in this area where big savings and profits can be made, provided the proper installations and the proper operative techniques have been developed.

General conclusion: It is incorrect for the evaluation of the research and development effort of "Big Steel" to pick out one single process development and to analyze the comparative results. The steel industry is a complex industry with a very broad field for research and development.⁷

7. Letter dated January 16, 1967, pp. 2 and 3.