



# Steel: Past the Crossroads

by Tom DuBois  
USWA Local 1014, Gary, Indiana

## *Introduction*

A majority of the 154,532 steelworkers who are presently laid off will never go back to work. They will be shut out of the steel industry because the steel companies have a new game plan. They plan to increase profits in such a way that they will not need to employ many steelworkers. In an effort to raise the price of steel and reduce labor costs, the steel companies will continue to cut down steel capacity, shut down old mills and departments and introduce labor-displacing technology. Unless public pressure forces the government to step in and change this game plan, the steel industry, steelworkers, and steel communities will never be the same—even with an upturn in the economy.

## *Steel Management*

Steelworkers' jobs are in jeopardy now because the poor management strategies of the steel corporations allowed many manufacturing facilities to become outdated and inferior to those of foreign corporations. The companies' current emphasis on making profits rather than making steel, makes the problem even worse.

The steel industry's problems have their origin in 1901, when multi-

millionaire banker J.P. Morgan created the U.S. Steel Corporation. Ever since, the companies have followed a financial strategy that has retarded the development of the U.S. steel industry. As early as 1936, *Fortune* magazine recognized the problems caused by steel management:

“(U.S. Steel), founded by financiers, has been dominated ever since by financially-minded men. The great question is how much has it been interested in protecting its investment (which means stabilizing) and how much in making and selling steel (which meant pioneering).”

The chief energies of the men who guided the Corporation were directed to preventing deterioration in the investment value of the enormous properties confided to their care.... The super conservative outlook of the Corporation has been contagious and the steel masters have in matters of policy acted like bankers. They have preferred to take no risks.... The industry still suffers from three decades of inertia.<sup>1</sup>”

The conservatism of steelmakers continued from the 1930's to the present. In the 1960's, Henry Broude,

## Research and Development Expenditures — 1977-1981

(dollars in millions, % of sales)

Company	'81	%	'80	%	'79	%	'78	%	'77	%
<b>Integrated</b>										
Armco	\$35.8	.5	\$29.9	.5						
Bethlehem	.4	.7	45.1	.7	\$41.1	.6	\$37.1	.6	\$42.7	.8
Interlake	3.3	.3								
Republic			18.7	.5	18.9	.5	15.1	.4	16.8	.6
U.S. Steel	74.4	.5	56.1	.5	56.6	.4	52.5	.5	49.8	.5
<b>Alloy/Specialty</b>										
Carpenter Tech	\$13.5	2.4	\$13.4	2.4	\$12.2	2.6	\$ 9.4	2.4	\$ 9.2	2.8
Bundy	1.5	.9	1.8	1.2	1.9	1.1	1.7	1.3	1.6	1.4
Western	.8	1.6	.6	1.1						

"There has been a steady decline in domestic R & D in steel. The current emphasis is on using existing technologies to solve immediate problems in order to secure a fast payoff. . . ." (p. 77)

"These figures for the steel industry are very low. The only domestic manufacturing industry with a lower level of R & D spending is the textile industry; the aluminum industry spends about twice as much." (p. 96)

—Office of Technology Assessment report

after doing extensive interviews with steel executives, wrote:

"These men feel a managerial obligation to stockholders. . . . They fulfill a leadership function, but one colored by a good measure of risk aversion."<sup>2</sup>

Just four years ago, Dr. Bela Gold, Professor of Industrial Economics at Case Western University, found that the steel companies have continued to neglect long-term production needs. He said that:

"Maximizing short-term profitability tends to encourage concentration on relatively low-cost and quickly-effected innova-

tions. Our highly developed capital markets facilitate the rapid reallocation of investments from one company to another on the basis of changing information provided by quarterly financial statements. . . . The use of capital budgeting techniques whose substantial discounting of future returns also tends to favor shorter-term investments."<sup>3</sup>

Dr. Gold's analysis was reinforced by a recent study by Harvard Business School professors which attempted to explain the loss of competitiveness in the American steel industry. They argued that American management's "super safe, no risk" mentality and their devotion to "modern" manage-

ment techniques result in inadequate long-term investment.<sup>4</sup> Not only have real (adjusted for inflation) capital expenditures declined but what *was* spent was spent poorly. "Bad" choices made as a short-term perspective led to a "static" view of technology and of market demands, not a "dynamic" view of future possibilities.

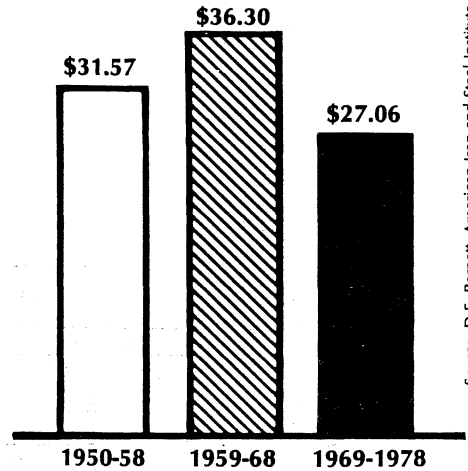
### *Technological Lag*

The effect of management's short-term approach to investment decisions is that the U.S. steel industry lags behind its foreign competition in the adoption of many different forms of steel-making technology. This can be demonstrated most clearly by looking at the various processes that make up steel production.

#### *A. Coke-making*

In formcoke technology, for example, a government study notes that "the U.S. led in the early development but

**Annual Average of Capital Expenditures on Steelmaking Facilities**  
(per ton of finished steel shipped in 1978 dollars)



Source: D.F. Barnett, American Iron and Steel Institute

most of the ongoing development is occurring abroad.... Eight of the ten leading formcoking processes and a score of less advanced concepts have been developed outside the U.S."<sup>5</sup>

The same pattern can be seen in dry

### **Capital Expenditures Per Ton of Steel Shipped — 1979-1981**

(figures in parentheses represent 1979 dollars per ton)

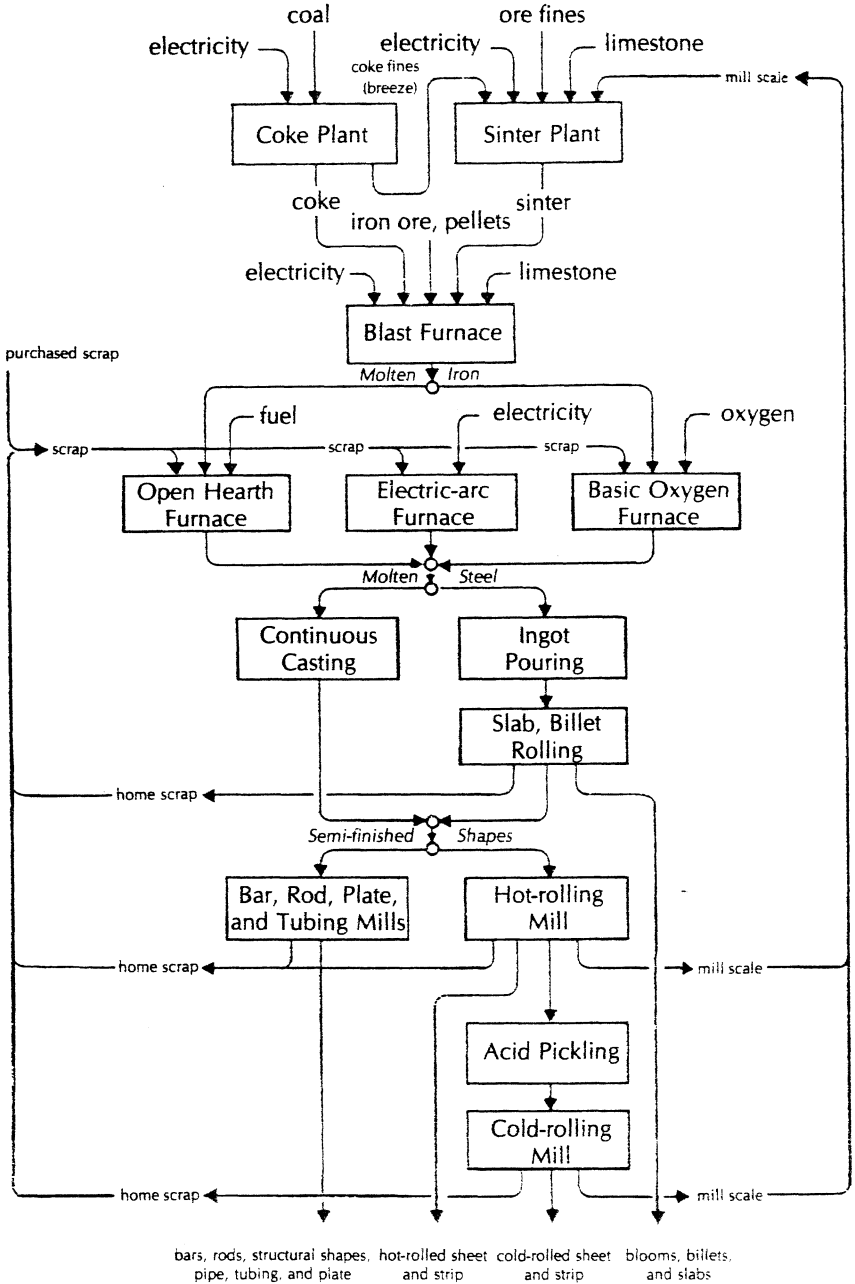
Armco	37.66	(30.05)	19.52	(17.19)	11.23
Bethlehem	34.01	(27.14)	40.51	(35.68)	26.02
Inland	20.05	(16.00)	41.81	(36.83)	43.29
LTV	31.56	(25.19)	27.65	(24.35)	32.74
National	28.15	(22.47)	40.26	(35.46)	24.27
Republic	45.26	(36.13)	55.07	(48.51)	46.28
U.S. Steel*	24.61	(19.64)	26.09	(22.98)	24.93
Industry Average	31.61	(25.23)	35.84	(31.57)	29.82

\*U.S. Steel ranks the lowest in 1981 and next to lowest in the other two years.

"The real issue here is whether the workers should have to pay for steel management's 20 years of failure to modernize. The steel industry's inability to compete... is largely due to its own shortsightedness."

—William Winpisinger, President, IAM

## Steel Production Process



Source: U.S. Council on Wage and Price Stability, *Report to the President on Prices and Costs in the United States Steel Industry, 1977* (COWPS, October 1977), p. 14.

**Note:** A circle at a junction indicates alternatives.

quenching of coke. An article in the *American Metal Markets* stated that:

"Japanese steelmakers have recently installed a number of dry quenching units at their steel plants, and one, Nippon Kokan KK is trying to sell its know-how and designs for dry quenching in the U.S..... Dry quenching of coke is an old energy-saving technology which has yet to find a home in the domestic steel industry.... (It) was first developed by a Swiss firm, Sulzer Brothers, soon after World War II."<sup>6</sup>

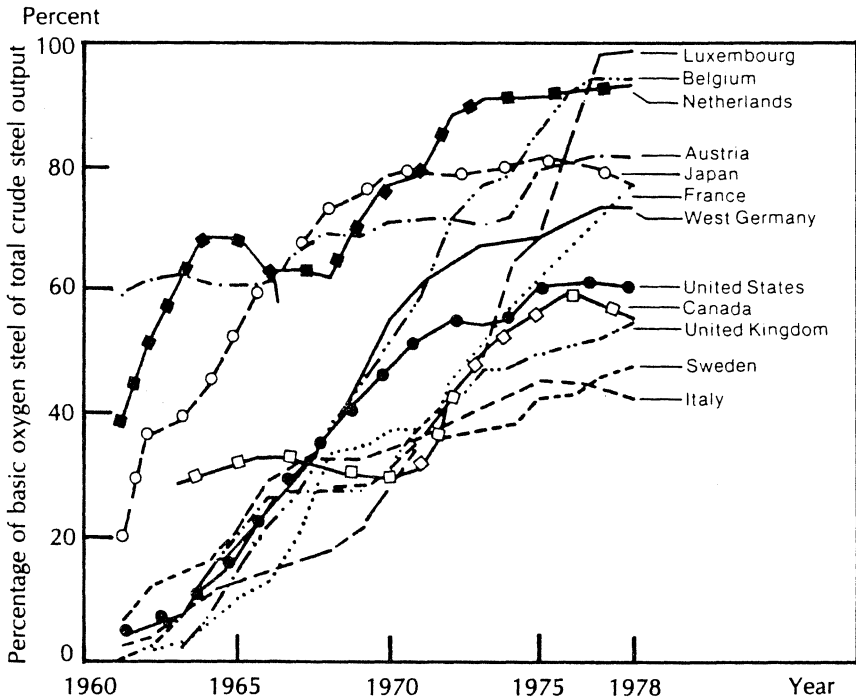
### B. Iron Making

Japanese leadership is equally clear in iron-making. *Steel Industry Economics* points out, "the Japanese have been the leaders in the development of the 'giant' blast furnaces. As the U.S. industry began to build them, they sought Japanese assistance. In 1976, the U.S. had 6 of them compared with 37 in Japan and 17 in Europe."<sup>7</sup>

### C. Steel Making

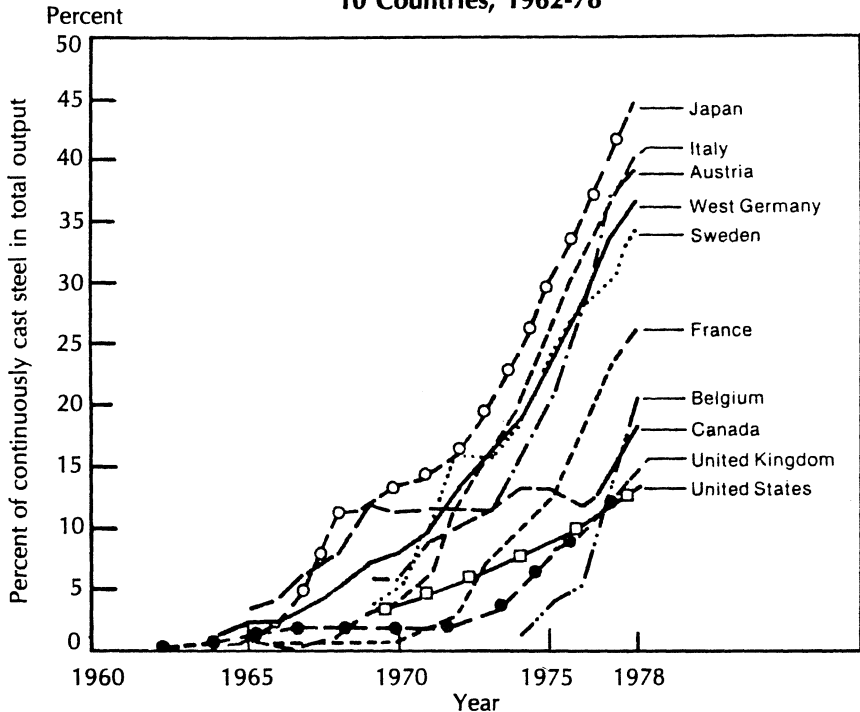
American industry has also been very slow to adopt basic oxygen process technology (BOF). In 1966, a study by Professor Adams and Dirlan found that:

## The Diffusion of Oxygen Steelmaking 12 Countries, 1961-1978



Sources: Organization for Economic Cooperation and Development; International Iron and Steel Institute.

## The Diffusion of Continuous Casting 10 Countries, 1962-78



Source: Organization for Economic Cooperation and Development.

"In innovation, as in invention, the giants of the U.S. steel industry lagged not led. The first large scale commercial use of the oxygen plan was in an Austrian steel plant in 1952. The first installation of the new process on the North American continent took place in a Canadian plant in 1954.... The leaders of the U.S. steel industry finally decided to innovate this revolutionary process fully 14 years after an Austrian company of infinitesimal size had done so, successfully."<sup>8</sup>

After BOFs were finally introduced in the U.S., American industry continued

to lag in their use. Since 1969, BOF capacity has continued to grow in Europe and Japan but has lagged in the U.S. By 1981, 61 percent of U.S. capacity was BOF compared to 75 percent in Japan, 80 percent in Germany and 84 percent in France.

### *D. Continuous Casting*

Continuous casting was not introduced on a large scale until oxygen converters came into widespread use in steelmaking. David Ault, in an article in *Western Economic Journal* said that:

"By the end of 1964, virtually all of the Western European producers had purchased patent rights on

machines from Concast AG. of Zurich, the owner of the patents on the perfected technique. Japanese producers acquired a continuous casting machine in 1960 and began commercial production shortly thereafter. Major U.S. producers did not attempt commercial production until 1967, and continuously cast steel products accounted for only less than 1 percent of total output by the end of the decade compared with 11.3 percent in Canada, 8.2 percent in West Germany, and so on."<sup>9</sup>

### *E. Other Technologies*

The list of "lagging U.S. technologies" is long. Development of ladle metallurgy and continuous annealing would certainly be on it.<sup>10</sup>

In order to get a sense of the overall picture, we can look at the data on technology transfer. An article in *American Metal Markets* stated that, "Of 18 agreements between domestic and Japanese steel companies only two of them are for providing U.S. technology to Japanese producers."<sup>11</sup>

### *The Effect of Technological Lag On Vulnerable Steelworkers*

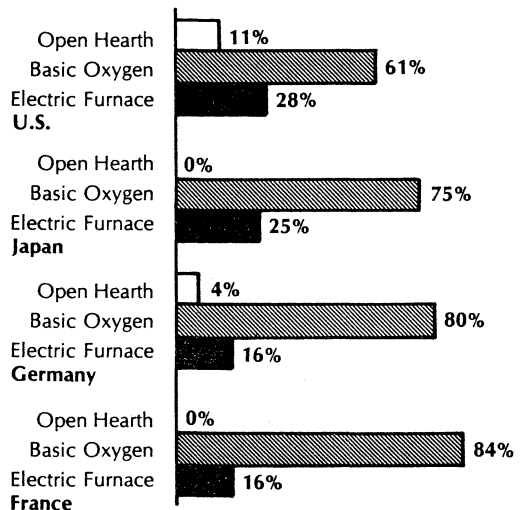
The fact that many U.S. facilities are "out of date" means that the industry is not cost-competitive vis-a-vis foreign facilities. U.S. steel now costs on average approximately \$100 per ton more than Japanese steel. A large percentage of the cost difference can be attributed to higher American energy costs. Hans Mueller and K. Kawahito note that "the Japanese steel industry is

the leader in energy efficiency, using only 20.4 million BTU per ton of steel products versus 30.4 million BTU for the U.S." As energy costs have jumped in the 1970's, this Japanese advantage has become very important.<sup>12</sup>

Older facilities also use raw materials less efficiently. The U.S. has the distinction of being, according to the U.S. Office of Technological Assessment, "the only major producing country where raw materials costs became a larger proportion of total production costs. In other countries raw materials became a smaller element of production costs...."<sup>13</sup>

The U.S. technology lag also has an impact on labor productivity, for older facilities use labor less efficiently. After studying comparative productivity in the U.S. and other steel industries, the

**Technology Gap:  
Steelmaking Processes 1981**





U.S. Department of Labor concluded that American steelworkers' productivity was amazingly high considering the outmoded equipment they had to work with.<sup>14</sup>

Finally, the technology lag had its impact on the U.S. steel industry's economic health. Adams and Dirlan concluded in their study that the wrong decision made by U.S. corporations to build more open hearth capacity rather than basic oxygen furnaces in the 1950's was an important reason why the companies' profits suffered later on.<sup>15</sup> David Ault found that the advantages enjoyed by foreign producers, who introduced continuous casters before U.S. firms did, allowed U.S. competitors "to expand their market shares at the margin and to erode U.S. market shares even further."<sup>16</sup>

### *Making Less Steel*

In the preceding section, we saw how poor U.S. Steel investment strategy created a technologically backward, high-cost industry. We now turn to the steel companies' strategy for solving their problems. A major part of their present plan is to produce less steel and sell it at higher prices. This strategy is a loser for steel workers.

After a rapid rise in total steel-making capacity during the 1960s, steel companies are now experiencing an equally rapid decline in capacity as plants and sections of plants are wiped out. The waves of shutdowns from 1977 to 1979 reduced capacity of raw steel production from 160 million tons to 153 million tons. The "official" level is now about 150 million. Forecasters predict further permanent reductions of 15 to 26 million

tons. This is between 10 and 20 percent of total output.<sup>17</sup>

We are all familiar with one form that reduction will take—the closings of entire plants. Bethlehem's Lackawanna plant and most of Armco's plate steel plant in Houston are the two most recent examples. According to the *Wall Street Journal*, two Republic Steel plants in Buffalo and Cleveland and some U.S. steel facilities in the Pittsburgh area are "among the candidates" for closings.<sup>18</sup> Most capacity reduction will come from closing sections of existing plants; however, companies will also begin to consolidate production in more modern or better located facilities. For example, both Republic and Jones & Laughlin have closed several coke plants and consolidated production in one location. (See the Appendix for more details.) U.S. Steel's President Roderick predicted recently that "some flat-rolled mills are going to close in the next 12 to 24 months."<sup>19</sup>

It is possible that shutdowns like these are just the tip of the iceberg. Back in 1980, Dr. Donald Barnett, steel economist, predicted that if the steel industry did not significantly increase its capital expenditures, most of its facilities that were more than 25 years old would have to be closed.<sup>20</sup> What's happened since? In 1982, the industry's capital expenditures were only \$2.1 billion. Predictions for 1983 are that capital expenditures will be only \$2 billion.<sup>21</sup> That's not even enough to keep the average age of existing facilities from getting older; and it won't come close to modernizing equipment that desperately needs it.

If current trends continue, we could see the "liquidation scenario" of the



American Iron and Steel Institute and the Office of Technology Assessment (OTA) become a reality.

Can this country afford the large reduction of steel-making capacity that is now occurring? Interestingly enough, the American Iron and Steel Institute, whose members include all of the U.S. steelmakers, recently published a paper arguing that "the media view that the domestic industry's problems are essentially the consequence of 'excess capacity' is clearly wrong.... The United States is the only major industrial nation in the world whose steel industry cannot fulfill its own domestic consumption requirements during periods of moderately good economic activity."<sup>22</sup>

Present U.S. shipment capacity (not to be confused with production capacity) is approximately 110 million net productions, or about 5 million tons below domestic consumption in a relatively "good" year such as 1979. And, in the event of a peak year such as 1973-74, when 122.5 million tons were consumed, the U.S. shortfall in meeting its own demand for steel would be even greater.<sup>23</sup>

What would happen in a good year for steel?

There would be a sharp rise in

imports and a sharp rise in steel prices. This is the "scenario" that steel executives and stock analysts are trying to create—"spectacular profits."<sup>24</sup> Thus, the *Wall Street Journal* reported that "Retirement of aging and technologically obsolete capacity has emerged as a prime element of domestic steelmakers' strategy to firm up prices when a recovery does come."<sup>25</sup>

As the AISI warned recently, "Without sufficient domestic capacity in the United States, there could be increased foreign dependence, decreased national security, vulnerability to supply shortages, and higher prices."<sup>26</sup> In other words, capacity declines would be disastrous for the nation; disastrous for the industry; and disastrous for the steelworkers, their families, and communities.

### *New Technology— Is There Hope for Steelworkers?*

Steelworkers are not only threatened with the industry's plans to cut back capacity. They are also threatened by the industry's plans to modernize facilities. Where this modernization occurs, steelworkers will lose jobs more often than gain them.

The "winners" and "losers"

resulting from technological change can be predicted now. A knowledge of where the jobs will be lost and gained should help individuals and communities plan for their own futures.

The following chart presents projected job losses and gains in different segments of the steel industry

during the coming years. It was derived from a chart provided AISI in 1980 and should be used with one caution: because the industry has decreased capacity since the projections were made, the job loss estimates indicated on the chart are too low and should be revised upward. In those areas where the chart shows a modest gain, a small loss should be substituted. (See Appendix article "Technology and Job Loss.")

## Employment in Steel

### Technology and Jobs: Projected Losses and Gains in Jobs (1978-1988)

Area	Job Loss/Gain	Change in Labor/Hours Per Year
Coke Batteries	-6,646	-13.2
Blast Furnaces	-6,294	-12.5
Electric Furnace	+7,400	+14.7
Open Hearth	-11,631	-23.1
Basic Oxygen	+2,266	+4.5
Strand Casters	+11,883	+23.6
Ingot Casters	-5,539	-11.0
Primary Mills	-9,617	-19.1
Finishing Mills	+4,200	+8.4

Source: *Steel at the Crossroads*, AISI.

## The Loss of Jobs

How many jobs will be permanently lost if the industry carries out its strategy of reducing capacity and modernizing selected facilities?

A rough estimate may be made by looking at past employment cycles. During the 1960s and 1970s, steel production more than recovered from each "downturn," but employment never did. Then, during the 1978-79 recovery, annual average employment remained virtually flat. Apparently, when steel production begins to pick up, steel companies combine jobs, work the existing work-force overtime, and install new technology rather than recalling former employees or hiring new ones.

Let's look at the employment figures for November, 1982. In that month, there were 152,000 steelworkers employed. This reflects a drop of about 150,000 workers from the peak in 1981. We can estimate that only 60,000 of those who were laid off will return, while 90,000 steelworkers will never return.

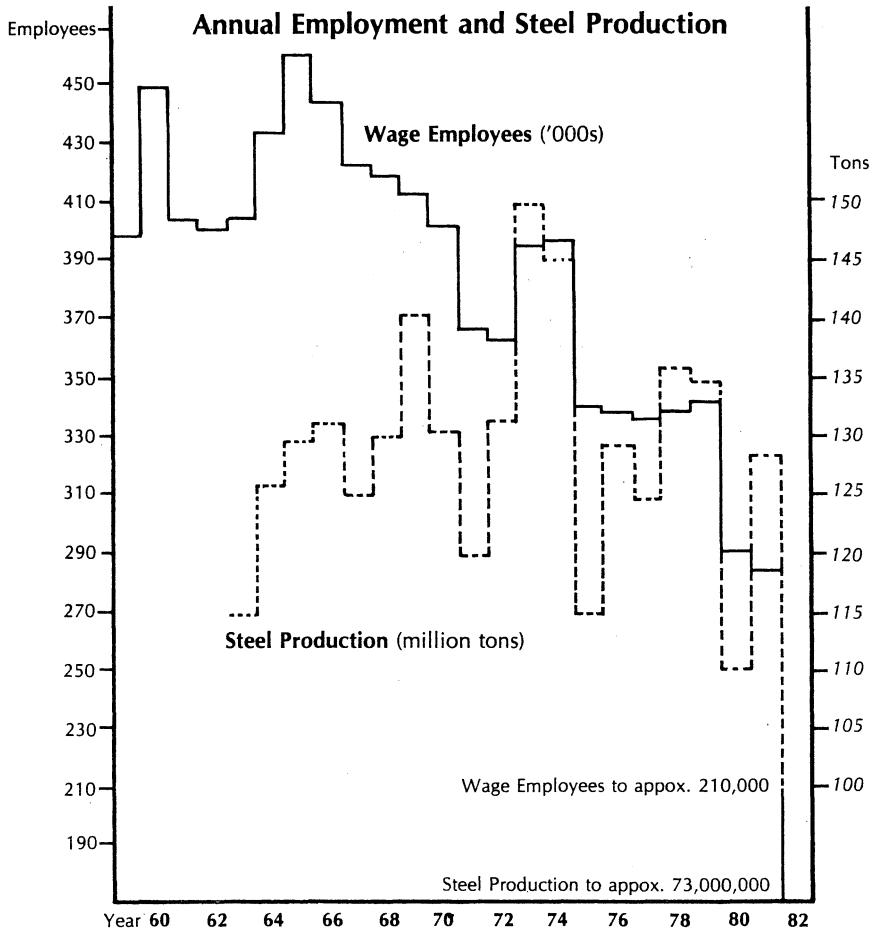
Is this estimate an exaggeration? How do we make it?

The AISI estimates that, if the steel

### Facts on Declining Employment

Highest Employment for Production and Maintenance—1953: over 571,000  
Employment—March 1982: 234,000

Years	Decline	Annual Rate
1950-1960	78,200	-1.6%
1960-1970	41,900	-0.9%
1970-1980	112,500	-3.1%
Total/30 years—	232,600 Lost Jobs	
1981—	78,400 Lost Jobs	



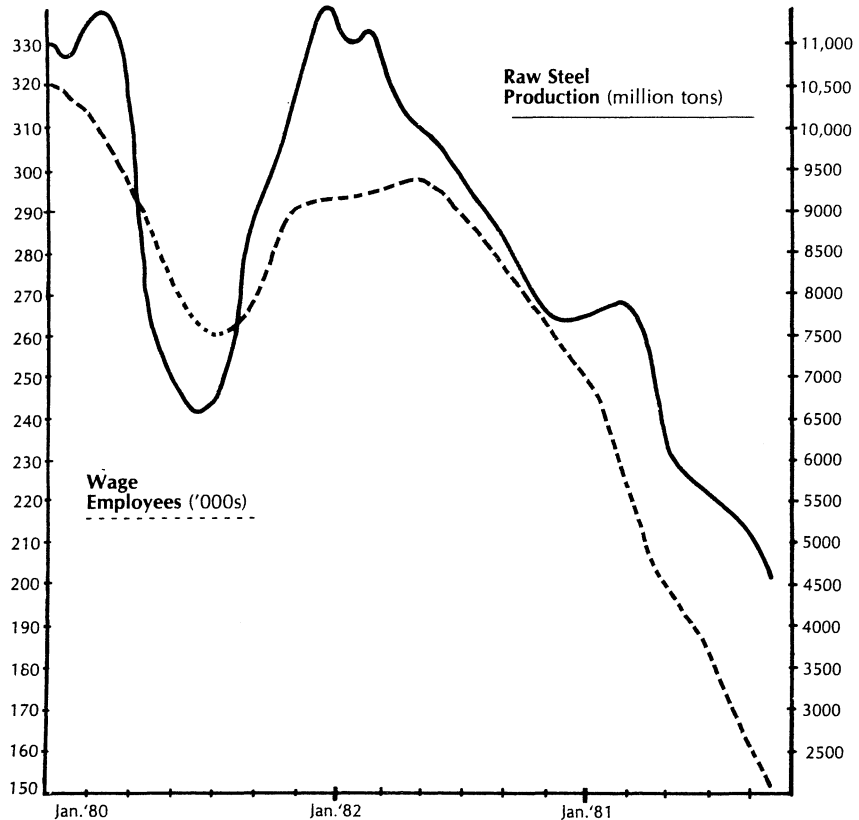
industry reduced its capacity by 20 percent in the years 1981 through 1988, the industry would employ 90,000 fewer people in 1988 than it had in 1981. But steel capacity is expected to drop to 20 percent below its 1981 peak in 1983 rather than in 1988. Therefore, we estimate that those 90,000 steelworkers won't be needed to run the mills at their reduced capacity.<sup>27</sup>

The permanent job loss of some 90,000 wage and salary steel workers is of such a magnitude that no existing re-

training program will help. William Roesch, president of U.S. Steel, compared the situation to:

"his own early career in the coal industry just after WWII and the shrinkage of employment there from 400,000 new workers at that time to about 200,000 now. Some workers found new employment in the then growing auto industry, he said. But others, usually over 50 years of age, are 'not interested

## Monthly Employment and Steel Production



in re-training or relocation. As a result, pockets of poverty still exist throughout Appalachia,' he said. 'When the jobs disappeared those who didn't find other work collected unemployment until it ran out and then went on welfare. National policy toward the problem of displaced workers is little different today. The problem will only exacerbate for steel and other manufacturing industries,' he said."<sup>28</sup>

### *Needed: An Alternative Approach To the Steel Industry's Future*

Today there is no growing auto industry into which unemployed steelworkers can be absorbed. Some retraining can be done for jobs in the service sector, but that is not a solution for the massive displacement we face. And what about the young people who in years past would have gone to work in "the mill." They are already being trained for those service sector jobs.

There aren't enough jobs there to go around.<sup>29</sup>

The situation of middle aged and older steel workers is desperate. Many can be seen wandering the streets of cities like Gary, Indiana, with their old steel mill caps and jackets, looking lost and forgotten.

This nation needs a new national policy to save steelworker jobs, steel communities, and the steel industry. A full analysis of what needs to be done is beyond the scope of this paper. But we can say that efforts to prevent plant closings through collective bargaining and through legislation are necessary. Existing jobs must be maintained and not combined. Job security provisions must be provided for in the contract. Worker ownership efforts must be analyzed and supported where they are sound.

In addition, the provisions of the "Technology Bill of Rights" (See Appendix II) must be considered and implemented. And, as Jack Metzgar suggests in another article in this publication, we need a National Industrial Policy that will provide a framework for efforts to save the steel industry.

In order to provide steel to consumers in a low-cost, efficient manner and to provide employment for thousands of Americans, we need one thing more—alternative forms of ownership and management. What these forms will be is too early to predict. But, throughout the rest of the world, there are all kinds of examples of alternative forms of ownership. These examples provide us with an enormous wealth of experience. It's time to study that experience and to discuss alternatives.

---

***"This nation needs  
a new national policy  
to save  
steelworker jobs,  
steel communities,  
and the steel  
industry."***

---

<sup>1</sup> *Fortune*, March, 1936.

<sup>2</sup> Brodeur, Henry, *Steel Decisions and the National Economy*,

<sup>3</sup> Gold, Bela, "Advancing the Technological Capabilities of U.S. Industries," in *Research Management*, Jan., 1979.

<sup>4</sup> *New York Times*, Jan. 9, 1983. "That American managers tend to be more concerned with short-term financial performance than their German and Japanese counterparts is now widely recognized." "Managing as if Tomorrow Mattered," Hayes and Garvin, *Harvard Business Review*, May-June, 1982.

<sup>5</sup> Office of Technology Assessment, *Technology and Steel Industry Competitiveness*, p. 294.

<sup>6</sup> *American Metal Markets*, September 27, 1982.

<sup>7</sup> Mueller, Hans and K. Kawahito, *Steel Industry Economics*, p. 50.

<sup>8</sup> Adams, Walter and Joel Dirlan, *Quarterly Journal of Economics*, May, 1966. "The first U.S. company to actually install the oxygen process was McLouth Steel in 1954. The first major company to do so was Jones and Laughlin in 1957, to be followed by U.S. Steel and Bethlehem in 1964, and Republic in 1965."

<sup>9</sup> Ault, David, "The Continued Deterioration of the Competitive Ability of the U.S. Steel Industry: the Development of Continuous Casting," *Western Economic Journal*, March 1973, p. 89. This process was originally patented by Sir Henry Bessemer in 1865. However, the engineering materials of the time were not at all equal to the demands of the process. Development went through a long series of improvements in both materials and designs. "Consistently economic results were not obtained until Siegfried Junghans conceived the principle of mold oscillation in 1933. Allegheny-Ludlum in the U.S. began operations on a small scale in the mid-1930s using this principle. . . . In 1938 the Russians built a conveyor-type casting machine. . . . Junghans built a small plant in Germany during WW II. . . . The first real operating success in the United States, however, was achieved on the Allegheny Ludlum pilot plant at Waterliet, N.Y. from 1947 through 1955." David Miller, and Terence Dancy, "Continuous Casting—Past, Present and Future," *Iron and Steel Engineer*, May, 1963.

<sup>10</sup> Ladle metallurgy refers to a process "of metallurgically refining (stirring, injection of powdered materials, vacuum treatment, reheating etc.) a relatively crude batch of steel in a ladle for the subsequent casting operation. . . ." *A.M.M.* Sept. 27, 1982. Continuous annealing heat treats and chemically prepared coils for

processing by end-users such as auto plants and appliance makers.

<sup>11</sup> *Ibid*, Sept. 27, 1982, "The Japanese were able as a result of these agreements to get a very close look at what their U.S. competitors were doing. This gave them the opportunity to find out what niches in the U.S. steel market may be available to them. . . . [Joseph] Wyman observed that most of the assistance pacts have been entered into since 1977, which indicated that the domestic industry should have reacted sooner to the availability of top notch technologies from abroad."

<sup>12</sup> Mueller.

<sup>13</sup> *Technology and Industry Competitiveness*, p. 142. "Within the materials component, direct energy costs have risen most and now account for almost 40 percent of raw material costs or 24 percent of total steelmaking costs."

<sup>14</sup> General Accounting Office, *New Strategy Required for Aiding Distressed Steel Industry*, Jan. 1981, p. 111-12.

<sup>15</sup> Adams and Dirlan, "If the industry could have begun to adopt the oxygen process as early as 1950, if this revolutionary process would have provided the industry with substantial savings both in capital investment and operating costs—does it not follow that Big Steel's profit grumbles are in part the result of self-inflicted injury?" The U.S. management had a very "static" view of BOF technology—only seeing what it could do at any one point in time, as opposed to European and Japanese "dynamic" views of what that technology would become.

<sup>16</sup> Ault, David.

<sup>17</sup> *American Metal Markets*, Dec. 29, 1982.

<sup>18</sup> *Wall Street Journal*, Dec. 29, 1982.

<sup>19</sup> *Industry Week*, Dec. 13, 1982.

<sup>20</sup> Barnett, Donald, *Economic Papers on the American Steel Industry*, 1981.

<sup>21</sup> *Wall Street Journal*, Oct. 21, 1982.

<sup>22</sup> Based on estimates from Barnett.

<sup>23</sup> *American Metal Markets*, Dec. 8, 1982, p. 14

<sup>24</sup> Merrill-Lynch.

<sup>25</sup> *Wall Street Journal*, Dec. 29, 1982.

<sup>26</sup> *American Metal Markets*, Dec. 8, 1982.

<sup>27</sup> American Iron and Steel Institute estimate in *Steel at the Cross-Roads*, 1980.

<sup>28</sup> *American Metal Markets*, October 12, 1982.

<sup>29</sup> See, for instance, *Indiana Labor Market Letter—Lake and Porter Counties*, "413 job openings were received (with nearly 20,000 unemployed steel-workers). . . . Occupations in demand were: cashiers and tellers; waiters and waitresses; and chefs and cooks." Oct., 1982, Indiana Employment Security Office.