

## JAMES W. BROWN • IRON & STEEL SOCIETY



James W. Brown, the recently appointed 1989 President of the Iron & Steel Society (ISS), has been a member of ISS and AIME for almost 30 years. Jim is an active member of the Society's Electric Furnace Division and has served on the Division's Executive Committee since 1974. He also was a Doctorate-at-Large on the Society's Board of Directors in 1985 and '86. In 1986 he served as chairman of the Administrative Committee for the 5<sup>th</sup> International Iron and Steel Congress. Jim also has been responsible for the Electric Furnace Conference's Opening Session since 1973. Professionally, Jim has worked for Union Carbide since 1956. He is currently Director of Market Development for UCAR Carbon Co. Inc., which is a wholly-owned subsidiary of Union Carbide Corporation.

The new ISS president resides in Wilton, Connecticut, with his wife Lynne and son Mitchell, the youngest of his three children. Mitchell is a senior in high school. Audrey, his middle child, attends Keene State in New Hampshire and Jennifer, Jim's oldest, is a graduate of St. Lawrence University and now lives in Boston.

A well-known figure in the graphite electrode field, Jim has been called upon by organizations from all over the

world to present economic and technical forecasts for the EAF segment of the steel industry. Hence, *Iron & Steelmaker* could not pass up the opportunity to hear Jim's views on the current and future status of EAF steelmakers.

**I&SM:** What do you see happening in the world of electric furnace steelmaking?

**BROWN:** The electric furnace has been presented with its third opportunity for growth. It is entering a phase of growth which could easily take it to 50 percent of total steel production during the next five to 10 years. The reason for this is the new technology associated with casting, primarily thin slab. It looks like thin slab is here and is viable – at least from a technical standpoint. I think strip casting is a little bit further down the road. But with the advent of this technology, you can now build a greenfield, flat product electric furnace plant on the scale of say a million tons or less. This was previously impossible to do because you had to cast thicker slabs. When you figured out their density and weight, you came up with something that had a million-and-a-half or 2-million-ton minimum size. This scale of operation was beyond the capability of market mills or smaller companies to finance. With the advent of this new technology, it opens up a whole new field for the electric furnace sector of the steel industry.

**I&SM:** Are you referring to Nucor's thin slab caster, and if so are you convinced that it is a success?

**BROWN:** Yes. Let's put it this way. It is a technical success. But it's too early to tell whether it is a success economically. It has operated successfully as a pilot plant but this is the first commercial plant. I am sure that there will be startup problems, there is no question about that. But in my opinion there is so much at stake, the economic incentives are so high that money, people, talent, whatever, will be thrown at it at such a rate that they will solve whatever technical problems that may arise.

**I&SM:** Is anyone else doing it?

**BROWN:** No. Nobody in the world is currently running a thin slab caster on a commercial scale. Nucor will be the first, worldwide. There are other firms, both large and small, who are waiting to see if it is a success and if the financial numbers come close to what has been estimated. They are talking about steel \$50 to \$100 a ton cheaper than the conventional route. Now that is a big number. The key thing is the scale. You don't have to build multimillion-ton facilities. And the market, as we all know, has never grown in multimillion-ton increments. That has been one of the problems of some of the older, integrated developments built in the third world, for example. They build these huge plants because they feel they have to justify the economics of the plant. It's the old bigger is better.

I cite thin slab because I believe this will have the greatest impact on how the steel industry is going to look in the nineties – more so than any other technology I can think of in the industrialized countries, particularly. This of course depends on whether it proves to be successful – not only technically but economically. As the conventional integrated facilities age, you have to rebuild them at a cost of \$1,500 to \$2,000 per ton of capacity. How are they going to be able to do that? Will they be forced by the economic facts of life to take on new technology and adapt it? Maybe it won't be electric furnace technology. Maybe it will be another technology. But the conventional way is not going to be the way of the future. New plants will be built in a completely different mode. The future of the arc furnace can only benefit from thin slab technology.

**I&SM:** What portion of raw steelmaking will come from the electric furnace in the future?

**BROWN:** Fifty percent in North America is reasonable to me. The steel mix in the United States is about 55 percent flat products and 45 percent nonflat products.



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The arc furnace must penetrate flat products as a baseload supplier of hot metal or liquid steel to casting machines for flat-rolled products. Flat products will bring into the equation the issues of scrap quality. Therefore, you will have to see improvements in scrap preparation and segregation.

**I&SM:** What do you see in the realm of new scrap preparation technology?

**BROWN:** In my opinion, down the road there will be improvements in raw materials. One thing that I think needs to be evaluated commercially, and hasn't been yet, is the continuous feeding of prepared scraps, for example, cryogenic scrap preparation. This was done years ago in Europe. What you do is take a traditional automobile bundle, freeze it in liquid nitrogen and then hit it with a hammer. It shatters like glass. And then you take that material and you can segregate out the nonferrous, the fluff, and what you have left is really the virgin metal with no paint on it or anything. It is unbelievable. And you take that material and continuously feed it to an arc furnace. What killed it in the eighties, when I was involved, was the cost. The cost and availability of nitrogen were factors. The cost of this method versus conventional shredders was too high. But no one ever did the analysis. What quality, productivity and cost benefits did it offer in the steelmaking operation? Like anything else in the steel business, you have to look at the total equation, not just one piece of it.

**I&SM:** What about eccentric bottom tapping?

**BROWN:** Eccentric bottom tapping has been a big, big hit, and it is very well accepted. I do think there are cases where you can say it is not for everybody.

**I&SM:** What is the advantage?

**BROWN:** You get slag-free tapping very easily. You can also get the metal out of the furnace a little bit faster – no question about that, but I think slag free is the big issue.

If you are going to replace an existing furnace, there could be some definite capital drawbacks. It is not easy, in every case, to take the old furnace out and put an EBT furnace on the old foundation.

**I&SM:** Let's talk about DC furnaces.

**BROWN:** The DC arc is very interesting to follow. The promoters of the DC arc are pushing lower electrode consumption as one of its main features. On the surface that is correct. But when you look at the better electric furnace operations in the world, some already have lower or at least equal electrode consumptions compared to DC arc installations. My position on that, from our business standpoint, is that I don't care if it is DC or AC, at the end of the day, you are going to have lower electrode consumption on a worldwide basis. And I don't think DC electrode consumption is going to be any lower than what it is in a well run AC shop. So I don't see the economic incentive, long term.

The most significant recent development was the announcement out of Japan that Tokyo Steel has contracted NKK to build a DC, single column, 130-metric-ton furnace for startup probably at the end of 1989. Comparing the AC and DC furnaces, their energy consumption is similar and their productivity is similar. But their refractory consumption is a question mark because here we don't know what the life will eventually be at the lower or bottom electrode. There have been a wide range of experiences with that bottom electrode life. The jury is still out on DC versus AC.

**I&SM:** Any other new technology?

**BROWN:** I am a great believer that we would be better off if the steel industry spent a little more time on optimizing what they have and a little less time on unproven technology that is 10 or 15 years down the road. We all have to survive between now and then. There are so many people out there who have yet to learn how to manage the facility and optimize the technologies that are

currently available. They have got to optimize what they have. They can make a lot of money by better utilizing known technology that is not capital intensive, adapting it, managing the facility and the people properly, without really spending very much.

**I&SM:** Do you feel that the activities of the Society contribute to this optimization?

**BROWN:** Yes. And there is going to be an ever increasing challenge to offer meaningful technical programs, and that is going to be the challenge to the members of the various divisions.

The national conventions bring the user, the engineer, the equipment supplier, the raw material supplier, all together under one roof where they can interact. And you need that. You need the proceedings so there is some documentation of the technology that exists at that given time. The national conference does create the environment where the user and the steelmaker can interact with the equipment and raw material suppliers, and vice versa.

There is a lot more professionalism and a lot more seriousness about the meetings. People are at the meetings to learn something. Making friends throughout the industry is also a big plus. People don't have the time to just go to the meetings for a good time – they go to learn something. They go to the meetings for the purpose of learning, and that is a challenge to the Society. The challenge is that the committee people who are involved have to make sure that they are constantly putting together programs that present meaningful data and information in a well orchestrated manner.

**I&SM:** Have you attended any of our continuing education courses?

**BROWN:** Yes. They certainly perform a need at the local level, when you have them tied into a chapter meeting. I think that is a good forum. I think it is paramount that suppliers, if the subject matter relates to them, should send their marketing people. First of all, they will



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learn something about the business, and it also offers them an opportunity to meet someone in the business. Right now I am not sure how many of the suppliers take advantage of the Society's courses and programs.

**I&SM:** What are you going to focus on as President of the Iron and Steel Society?

**BROWN:** First of all, the Society is "we" members. Somehow we must continue to work together and communicate that we are one. We need to communicate with the members that we are working for the benefit of all of the members. The Ferrous Metallurgy Grant Program is an example. This is a major area where the Society can help the industry and the individual, no question. This program is the biggest accomplishment that has been made in the last few years. Certainly, in the next couple of years, efforts will be made to assure that it is successful. How do we monitor the grant to get what we think we want to get out of it? How do we make out money work and leverage it to do more things is really the challenge facing the Board.

These are things that have to be brought to the attention of the Board. This is really the kind of work the Board should be doing. How to better utilize the funds that we raise and leverage them to get more value for the Society, which is the membership and the industry as a whole.

I think the Society is doing a hell of a good job at this juncture. It is healthy, financially solvent, and certainly vibrant and active. I guess the challenge is how you continue to maintain that degree of commitment and vitality ad infinitum. I want to make sure that we stay vibrant, stay current. Individuals have to make this happen because, as I said, the Society is made up of individuals. That is an ongoing challenge. If you get stale, if you get bogged down with traditional ways of doing things, that is a danger. Maybe we ought to periodically stand back and look at ourselves and say "Hey,

is this structure that we have today still appropriate in light of what is happening in the industry?"

**I&SM:** What are you referring to?

**BROWN:** The entire United States steel industry is going through an evolutionary state which, in my opinion, is going to drive all companies to be market mills. If you are USX or Bethlehem you might have five mills serving different markets but they will be, in fact, market mills. They will be geared to the customer, make limited products and focus on serving the customer. They will not be making tons of steel and then trying to find a home for them. They are going to be tailored, designed and operated to serve the customer. The concept of the market mill is what is important, and it is focused on serving the customer. And the technologies and size of the operation have no bearing on my definition.

And if you say you are not going to need plants that service a myriad number of markets, you are going to have to change. If you are going to supply say 10 tons of a specific product to a specialized customer, you are going to have to change. Sooner or later, rather than being a 5 million ton blast furnace/coke oven facility, or whatever, each facility is going to wind up being something smaller. You as a company may not change in size, but for sure your facilities are going to line up differently. You will have the proper facility, the proper technology to allow the maximum flexibility to serve that market niche. There is definitely going to be a basic change in the steel industry. *I&SM*