

# Second Annual General Meeting

## The Indian Institute of Welding Presidential Address

By K HARTLEY

During the year that has passed since the last Annual General Meeting of our Institute it was hardly to be expected that, with the economy in general and the engineering industry in particular continuing to remain under the shadow of the recession, any spectacular advance would take place. Nevertheless I think we have achieved a great deal in consolidating and developing the Institute.

### Activities of the Institute

I do not wish to dwell at any length on the various activities of the Institute as these have already been dealt with in the Annual Report of the Council which is before you but I would just like to make passing mention of an important event which is not referred to in the Annual Report as it took place after the end of the year in question. This was the Welding Seminar in Bombay. Its main significance lies in the fact that this was the first time that the Institute was able to step out of its headquarters in Calcutta. The Seminar was a great success and I hope it will lead to the formation of a Branch of the Institute in Western India in the very near future. Held on 20th August, 1968, at the Auditorium of the Central Labour Institute it aroused keen interest in engineering circles in Bombay.

Preparations are also afoot to hold a similar Seminar at Madras in a few months' time under the auspices of the Institute and the initial response, I am pleased to report, has been very encouraging.

### Welding Technology Abroad

In the sphere of welding technology there are hardly any major developments on a world-wide scale to record. Further refinements have taken place in some of the existing welding processes, greater sophistication achieved in certain types of welding equipment and a greater variety of commercial applications found but no new processes as such have been added nor has any significant technological advance been recorded.

In fact if we look back to the history of welding technology in the world we find that its progress may be recorded in the shape of a series of plateaus; each succeeding plateau reaching a greater height. For instance the post-war period was marked by a series of important advances such as the development of MIG Welding and Electro Slag Welding. Then in the early fifties there was a comparative lull—a plateau had been reached. In the mid-fifties we again find a steep ascent with major developments such as Friction Welding, Plasma Arc Welding and Cutting and Ultrasonic Welding. Then, after another pause in the early sixties, there is again a period marked by significant developments such as Electron Beam Welding, Short Arc Welding, the Pulsed Arc Process, Explosive Welding and Laser Welding.

### Welding in India

In India too we seem to have arrived at a plateau though it is a plateau on a much lower level than that

reached in the more industrially advanced countries. This is only to be expected as the recessionary wave has still not receded ; the engineering industry, notably the structural and wagon building sectors and others where welding figures prominently, have indeed been the hardest hit.

### Gas Welding and Arc Welding

There are, however, certain developments in the welding industry which indicate a measure of advance. Additional ranges of consumables in the field of arc welding have been developed. In the sphere of power sources for arc welding steps towards self-sufficiency have been taken ; rectifier sets, combined AC/DC welding power sources, resistance welding machines, equipment for semi-automatic submerged arc welding and TIG welding have been developed by different manufacturers in the field.

In the sphere of manual arc welding electrodes, India is now virtually self-sufficient and even though under special circumstances some imports continue, their proportion to indigenous production is negligible. In the manufacture of consumables for the automatic processes quite a large measure of self-sufficiency has also been achieved, e.g., filler wires and flux powders for submerged arc welding and continuous electrodes for automatic open arc welding.

With gas welding and cutting also we have moved forward and today many types of welding and cutting equipment and cutting machines are being manufactured in India.

To achieve increased productivity more use is being made of mechanised and automatic techniques in the country. This applies to welding as much, if not more, than to most processes. Automatic arc welding is being used in almost every major steel fabricating works. The Railways are now making considerable use of mechanised methods of welding for producing continuous rails. For conditioning of steel billets major steel works are introducing mechanised scarfing equipment ; a hot scarfing machine has already been installed at Alloy Steel Plant, Durgapur, whilst Hindustan Steel Ltd., Rourkela and The Tata Iron & Steel Co. Ltd. are expected to instal similar machines before very long.

Another development that needs to be taken note of is the establishment in India of new types of industries which make a demand for special types of welding electrodes and equipment and for more sophisticated

techniques of welding. In Defence production, for example, the tendency towards greater self-sufficiency has led to a demand for special electrodes for the welding of heavy armour plates. A rapid growth in the course of the last year or so of chemical and petrochemical complexes and of the fertilizer industry has necessitated the increased use of special steels, stainless steels, aluminium and other metals. There has also been extensive use of special types of pressure vessels and pipes. Finally, the development of the most modern of all industries, that connected with the development of atomic energy, has posed welding problems of its own.

Indian welding engineers and manufacturers of welding equipment and electrodes have, I am happy to say, tackled these problems with courage and imagination and have kept pace with the diverse needs of our industrial complexes.

### Standards

During the course of the last year or so the work of standardisation in the field of welding equipment and consumables has proceeded apace. A number of existing standards have been revised and a number of new standards have been laid down. Mention may be made in this connection of revisions of standards for metal arc welding of mild steel, specifications for equipment for eye and face protection during welding, qualifying tests for metal arc welders engaged in welding structures other than pipes and filler rods and wires for gas welding. New standards have been introduced in respect of arc welding rectifiers and submerged arc welding of mild and medium high tensile steels. The work of standardisation is of extreme importance from the point of view of developing welding technology and I have no hesitation in recording that The Indian Institute of Welding has every intention of continuing to take a keen interest in this sphere.

In the background of the rather dismal economic scene even the advance that has been registered in the fields of gas and arc welding and standardisation has considerable significance.

### The Recession

How dismal the economic scene was during the year under review is apparent from Government statistics which reveal that unutilised capacity is still a serious problem in the engineering industry and that the recession continued to plague the economy, particularly in important sectors of the engineering industry.

Despite claims that corrective measures have been taken by the Government there were no indications that the recession was lifting. The position is well illustrated by the percentages of utilisation of capacity which, for example, for the manufacture of arc welding electrodes stood at 63%, for machine tools it was as low as 40%, for electric welding machines 49%, gas welding and cutting equipment 57%, manufacture of railway coaches and wagons 32% and for heavy structurals only 14%.

### **Some Problems for The Industrial Gases Industry**

I would like to refer to certain problems related to the manufacture of industrial gases. In recent years there has been a mushroom growth of firms manufacturing industrial gases, some of which cannot be said to be economically viable. In every industry there is a certain minimum level below which operations just cannot be economically viable; the appearance of units below this level has a harmful effect on the industry as a whole and, what is more important, on the national economy. It also has a retarding effect on the growth of welding technology because far from being able to make any contribution in this direction such units merely retard the advancement of the industry. Another disadvantage flowing from the proliferation of small sized units is that it prevents larger sized units from deriving the full benefits of economies of scale which in turn inevitably results in gases not being produced as economically as they should be; in the final analysis costs of welding and cutting are affected. This is not a branch of industry that lends itself to the cottage industry or the small scale pattern and it is indeed more regrettable that the authorities have seen fit to ignore the experience of more advanced countries in this respect, experience on which they could so fruitfully have drawn.

Another problem facing the industrial gas manufacturers in India is the absence of facilities within the country for the manufacture of gas cylinders, other than those for use with oil refinery produced LPG. This constitutes a serious obstacle in the development of the industrial gas industry as it means considerable expenditure of valuable foreign exchange and it is to be earnestly hoped that Government and industry will get together to solve this problem without further delay.

### **Training of Welders**

Last year in my speech I referred to the problem of training of welders and mentioned that engineering

colleges and technical institutes were not keeping pace with modern developments in the field of welding. Despite the introduction of certain training facilities in universities and technical institutes the position remains unsatisfactory as the knowledge of welding imparted to those who pass through these institutes is insufficient to be of any practical value to them in their actual employment. The importance of stepping up training facilities is underlined by the developments taking place in our economy. As I have mentioned earlier the drive for self-reliance is leading us to diversify into new types of industry and this calls for training in specialised techniques of welding suitable for these new industries. The Institute has taken note of this continuing lag and will do all it can to see that remedial measures are taken.

### **Price of Steel**

The recent increases in the price of steel and of the quality extras of special steels is a matter of concern for all consumers of steel and for the welding industry. In May 1967 complete decontrol of steel was announced and responsibility for pricing and indenting for billets and flats products was handed over to the Joint Plant Committee. Immediately after decontrol the Joint Plant Committee increased the prices of steel, the rise ranging from Rs. 52 per tonne for billets, Rs. 32 for structurals and Rs. 58 for plates to Rs. 352 for galvanised sheets. A year later on 31st July 1968 an average increase of Rs. 46 per tonne was announced, a smaller increase on bars (Rs. 20 per tonne) and a larger one for sheet prices (between Rs. 71 and Rs. 261 per tonne).

Increases in the prices of steel will only delay the recovery of the engineering industry from the recession and to the extent that the off-take of steel from our steel plants continues to remain low it will affect the viability of the steel plants themselves. It is unfortunate that consumers are compelled to pay the price for mistakes in planning and for the inefficiency that still persists in certain sectors of the steel industry.

The price of mild steel core wire for electrodes continues to be high in comparison with prices prevailing in other countries because of the substantial quality and size extras demanded by steel-makers in India. The prices charged for the quality and size extras are not in line with international prices and are imposing a serious burden on the welding industry.

Another aspect of the matter to which I would like to draw attention is the change in the industrial

pattern of the country. In keeping with the drive to give the highest priority to agriculture the emphasis now is on industries likely to promote agricultural growth such as fertilizers, chemicals and petro-chemicals. The plants for these industries involve extensive use of high alloy steels, stainless steels, acid and heat resistant steels. The emergence of this new industrial pattern has two implications for the welding industry. One is that it is likely to lead to a new phase of welding in India where welding of stainless steels and other special alloy steels will play an increasingly important role ; this will naturally lead to new developments in welding technology in these particular fields. But there is also another aspect of the matter. Welding of special steels will require special electrodes with stainless steel and alloy steel core wires. At present certain such core wires need to be imported but with the development of indigenous facilities for production of special steels, imports are now being banned. Indigenous supplies of these special types of core wire are, however, according to present indications, likely to be very much more expensive than those from imported sources. This will naturally add a new burden to the welding industry. In so far as part of the increased cost will have to be passed on to the consumers of special electrodes it is bound to enhance the cost of erecting new plants where extensive use of alloy steels is involved.

In determining the price structure for steel all these factors need to be taken into account.

### **Export**

The difficulties that stand in the way of exporting electrodes were pointed out in my speech last year. During the year now under review an encouraging development has been the rise in exports of engineering products. To the extent that many of these products—wagons, for example—are largely welded, their export will have a beneficial effect on the welding industry. Moreover, since these products will have to compete in international markets in respect of quality and price, greater exports are likely to encourage the use of more sophisticated techniques of welding and of automatic welding processes.

The decision of the Government to supply steel at international prices for export has certainly been of great help, but it has to be remembered that the price of steel is after all only one of the many components that make up the total cost of an engineering item meant for export. What is of equal importance is to increase productivity and raise efficiency—then and

only then will we be poised to compete effectively in international markets.

### **Research**

Not much progress has been made in this direction, but one may refer to certain beginnings which though small are encouraging. At the Central Mechanical Engineering Research Institute, Durgapur some provision has been made for sponsored research and I hope in course of time that this will develop into a full scale programme of research.

When dealing with the question of research, however, it is necessary to bear in mind the warning recently issued by Professor Blackett about the unnecessary waste of national resources in pursuing re-invention. World technology is advancing by leaps and bounds and some of the more advanced countries are able to devote a considerably higher investment to research and development. In some cases, in fact, in many cases, it is far more economical for an under-developed country like India to buy, or pay royalties on technological inventions than to waste scarce resources on trying to undertake such work itself. In other words while research and development must form a part of the development programme of every country including the under-developed ones it is necessary to be selective in approach and it might be more worthwhile to use our resources to find out how to adapt to our local conditions techniques already developed abroad than to try to spend large sums on basic research. Subject to this warning I hope that efforts to promote research will continue both in individual companies as well as in Government and other technical institutions.

### **Achievements and Outlook for the Future**

In the short period during which The Indian Institute of Welding has been in existence, the spade work for a balanced growth of the welding industry in India has been carried out. The importance and necessity of an institute of this nature has been explained in engineering circles in some at least of the important industrial regions of the country. A beginning in the process of exchanging experience through welding seminars has been made. We have even been able to draw upon the experience of advanced countries at lecture meetings arranged for welding experts visiting India from abroad. Our membership is steadily rising. Preparations for setting up branches outside the headquarters of the Institute at Calcutta have begun. Our journal has now seen the light of day. With these achievements behind us we must now look ahead a little and think of the future.

The future of Indian welding is naturally linked with that of Indian industry. Even though no clear signs of an early end of the recession are visible I am confident that the worst is over and we shall, in the days to come, see our industry resume its onward march. The welding industry will have to keep pace with developments and must prepare itself today to solve the problems of tomorrow.

It seems that one of the major tasks ahead of us is to achieve complete self-sufficiency in the field of welding equipment and consumables and to acquire the capacity to use all the techniques of welding developed in the more advanced countries of the world. It is only after this has been achieved that we can hope to be able to make some contribution of our own to the development of welding technology. The idea of contributing to the science of welding may sound like a pipe dream today but let us not forget that only ten years ago Japan was lagging behind the industrialised West in the field of welding. Today she has not only drawn abreast of the most advanced countries but has been able to make significant contributions to welding technology. If we can emulate the example of Japan and work steadily there is no reason why we too should not be able to record similar achievements. There are, after all, fields in which Indian scientists and engineers have made notable contributions and I am sure our welding engineers and technologists will not be found wanting given the right climate and the requisite opportunities.

The Indian Institute of Welding will on its part devote itself steadfastly to the task of developing welding technology in India and before I conclude

I would like to say a few words about future programmes that we have in view for the Institute. Our first task obviously must be to consolidate further our organisation. In this respect we must ensure that more members, individual as well as corporate, are enrolled and that steps already initiated to set up branches in Western India and Southern India bear fruit. Our next task will be to establish centres in other important industrial regions of the country such as for example in the North and in the heavy industries region around Jamshedpur and the adjoining areas of Bihar and Bengal.

We must also make efforts to see that the journal we bring out becomes an effective vehicle of communication amongst members of the Institute and is able to make a really worthwhile contribution to the growth of the welding industry.

In the sphere of research too our Welding Research and Survey Sub-Committee has drawn up a plan of activities which, I am confident, will begin to yield results in the course of the coming year.

I would like to take this opportunity of thanking members of the outgoing Council and of the various Committees and Sub-Committees for the help and cooperation I have received from every one of them. And finally I would like to thank you all for the honour you have done me in appointing me President of the Institute for a second term ; it will be my endeavour to serve the Institute to the best of my ability and in this task I am sure I shall receive full support from all members of the new Council.