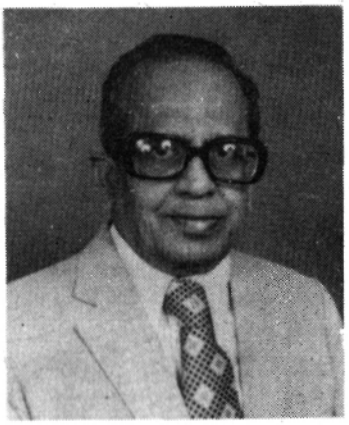
In Commemoration of Silver Jubilee Year

History of Manual Electrode Production in India



- S. V. Nadkarni

This is a momentous occasion indeed when our Institute is stepping into its 25th year. How eventful and rewarding these years have been during which our family of fellow welders has grown vast and closely knit! All who have contributed to its birth and to its growth to the present stature must feel proud with a sense of achievement. At this time we sorely miss departed stalwarts like M/s. K.Hartley, I.T. Mirchandani, R. Ghosh, Prof. Chandiramani and N. Mukherjee. Looking at the zest and dedication of the current members in the Governing Council and various Committees at the Headquarters and the Branches, one feels confident that the Institute will grow from strength to strength and function most creditably in the years to come.

I thought this would be an appropriate platform for me to recall my early association with the electrode industry so that this interesting piece of history gets recorded in the Institute's proceedings

It was the year 1945. The World War II had just ended. I had jointed Indian Hume Pipe Co., at Wadala, Bombay, as a Welding Chemist. My job was supervise the production of electrodes which was already an established practice here since the early 40's.

The electrodes were produced by dipping. Straightened and cut lengths of wire were first helically wound with multiply cotton thread by manual workers. About pieces were kept immersed in a thick slurry in a shallow galvanised iron tray. The slurry consisted of powdered flux, sodium silicate and water. The main flux ingredients were low grade ilmenite from Ratnagiri, iron oxide, manganese dioxide, glass powder, silica, mica, talcum and ferromanganese.

The soaked electrodes were taken out and dried outside in hot sun like household papads. The dried electrodes were bundled with a string and wrapped in paper. Thus the entire manufacturing process was elementary, possibly based on that used in the production of agarbattis and divali sparklers.

These electrodes were used only internally by the Company on all sorts of m.s. fabrications including low-pressure water pipelines and penstocks. I remember that penstock pipes were laid at Jog Falls and Papanasam at that time, and the electrodes were found to work satisfactorily on them.

This is amazing, considering that these were thinly coated electrodes and quality control was minimal. The core wire was low-carbon m.s. wire, a final product of the electric steel melting shop, rolling mill and wire-drawing plant which operated at the Wadala Works. Occasionally, on all-weld tensile test was made. The specimen was fairly wound with minor pores and gave adequate tensile strength and ductile fracture.

Two years later, i.e. in 1947, Dr. Lakner joined Hume Pipe and brought over a simple electrode extrusion plant he had devised and had been operating at National Radio & Engineering Co., at Mahalaxmi, Bombay, since 1943. Dr. Lakner was an Austrian jew and had a Ph.D. from Vienna University. He had fled to Indian to escape Nazi atrocity. The electrodes produced at N.R.E. Co., were branded "ENNAREE" and were sold to fabricators in the western region during the war years when imports from U.K. had stopped.

Dr. Lakner's was an automatic continuous low-pressure low-speed extrusion plant. A coil of wire at

one was fed into straightening rolls which drove it forward while four spools of cotton thread revolved around it and helically wrapped it with thread. The thicker the thread, thicker would be the coating after extrusion. The maximum coating factor achieved was 1.45.

The thread-wound wire then passed through the extruder. It consisted of vertical cylinder filled with wet flux. Downward pressure on the flux was maintained by a motorised screw which moved down the bore of the cylinder at a fixed speed. The coated wire emerging from a die next passed through a metre long electric heater heated with nicrome wire heating elements, and onwards to the cutting device which cut it into required lengths. The striking and gripping ends were made later on motorised grinders manually.

Rimmed low-carbon steel wire was procured from Indian Steel and Wire Products, Jamshedpur. The main flux components were rutile or ilmenite from Travancore, felspar, chinaclay, calcite, silica, manganese dioxide, talcum and ferromanganese. Sodium Silicate and gum arabic were used as binders. All-weld tensile tests, bend tests and analysis of weld deposit for C and Mn were carried out regularly. At that time, with limited outside contacts, I carried the impression that Dr. Lakner's was the most up-to-date and first automatic electrode plant in India. A few years later I learnt that in Calcutta, Indian Oxygen had been producing fully extruded electrodes Ferrospeed and Vortic (without thread winding of the core wire) on a real modern plant in collaboration with Quasi-Arc of England since 1939. I had occasion to see this plant in operation later. Extrusion pressures were pretty high for those days but low by to-day's standard. I guess the maximum coating factor was 1.45. Continuous wire was fed into the extruder whose cylinder stood vertical and was pressurised by a motorised screw. The coated wire was cut to standard lengths at the other end. The electrodes were dried separately in gas-heated ovens. The next step was a big leap forward and it was taken in 1952 when Dr. Lakner got Advanis to start a most modern high-pressure extrusion plant with Oerlikon collaboration at Bhandup, Bombay. My association with Dr. Lakner left Advanis in 1953 after the Bhandup Plant was firmly established and joined Oerlikon in England. During his 11-year stay in India, Dr. Lakner showed extreme passion for the production of quality electrodes. He can be truly called the Pioneer of electrodes in India.

Since 1953, the Indian electrode industry has not looked back. Its further steady progress and valuable contribution to the phenomenal growth of our welding industry is common knowledge among all of you and needs no repetition.

Reverting to the old practice of winding cotton thread on the core wire, I must mention that besides providing the requisite to the flux coating it also produced a gaseous shield by combustion in the arc. I recall that even as late as 1952, some of the heavy-coated low-allow steel and hardfacing electrodes produced in Europe had a winding of aluminium wire or asbestos thread around the core wire.

I must also mention the difficulties we faced in introducing modern electrodes among Indian Welders in the early 50's. For example, when welders saw for the first time the smooth surface, even ripples and side-wash effect of heavy-coated m.s. electrodes, they rejected it saying that the metal was hard. The misconception arose from the fact that these welders had been accustomed to light-coated m.s. electrodes which gave a rough weld finish and uneven ripples. The only heavy-coated electrodes giving smooth finish and even ripples they had used were the hardfacing types. I also vividly recall the angry reaction to low-hydrogen electrodes when they were first tried out by a structural firm in Calcutta in 1953. The welder had prepared on all-weld specimen using long arc and wide weaving which was the standard technique those days. The resultant specimen was as porous as a sponge.

Welders, however, did not take long to learn correct technique and produce sound welds. Acceptance of low-hydrogen and other modern electrodes in the latter half of the 50's was hastened by the coming up of projects like Bhilai Steel, Rourkela Steel, Integral Coach Factory and TELCO, where foreign welding experts dictated the selection of electrodes and insisted on the use of modern heavy coated types.

I feel highly honoured and pleased that I am given this opportunity to inaugurate the Pre-Jubilee Celebration of the Institute. I also feel that the Bombay Branch has been doubly honoured by being given the chance to set the ball rolling for the Jubilee year as well as to organise the National Welding Seminar next November. I look forward expectantly to these events as much as you all do, for the additional goodwill and knowledge they will generate. I sincerely pray to the Almighty to shower blessings on the organisers and crown their efforts with success.

With these words, I declare this Celebration open. You may now start the evening's proceedings.

HONOUR TO SHRI S. V. NADKARNI

Shri S. V. Nadkarni, after obtaining the Post Graduate Degree in Chemistry had joined the Indian Hime Pipe Co. Bombay in 1945, where he was associated with the manufacturing of manual metal-arc welding electrodes. In 1951, he joined Advani-Cerlikon Ltd., as Chief Chemist. Here also he was instrumental in the development of welding consumables for Arc Welding. He underwent considerable training at M/s. Cerlikon, Zurich, during the 50's and 60's. As a Colombo Plan Trainee, he received shop-floor training for five months at John Thomsons, UK in 1956. He was a member of National Productivity Council team on welding which toured UK, USA & West Germany in 1961.

Shri Nadkarni worked as UNIDO Expert in Brazil in 1979 and drafted basic standard and specifications on welding there. He was also the Chairman of the Working Group on "Liasion with Developing and Non-member Countries" of the International Institute of Welding. He was also the Vice-President of the Union of International Technical Associations set up by UNIDO in Paris.

Shri Nadkarni was the Convenor of the Welding General Committee of the then Indian Standards Institution. He was the President of the Indian Institute of Welding during 1982-1984. He represented the IIW in the General Council of the International Institute of Welding for several years until 1985. He has been associated with the Welding Industry both in India and abroad for well over four decades.

A Scroll of Honour and a Silver Salver are presented to Shri Nadkarni, the Doyen of the Indian Welding Industry for his outstanding contribution to the advancement and growth of welding technology in the country and abroad.

AME-IIW EXAMINATION

The Indian Institute of Welding, a National Professional Body fostering Scientific & Technological developments in the field of Welding Technology in India, has been organising AME-IIW Examination twice in a year viz. June & December - since December 1987 at the following Centres viz. Delhi, Calcutta, Bombay, Madras, Tiruchirapalli, Visakhapatnam & Cochin.

The Course Curriculum Syllabi of the Examination has been so designed as to have the equivalence with the Engineering Degrees as offered by the Indian Universities, IIT's or Professional Bodies like The Institution of Engineers, The Institute of Metals etc. The purpose being to create career opportunities and incentives for the person in the profession.

The eligibility for appearing in the AME-IIW Examination shall be minimum of Educational Qualification of Higher Secondary School Examination in the Science stream and must be an Associate of the Institute.

The cost of the Syllabus for the Examination is Rs. 15.00. Interested person may have their copy by sending Rs. 15.00 by Money Order to the Institute.

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