

VALEDICTORY ADDRESS : NATIONAL WELDING MEET '97, CALCUTTA

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I am honoured to be asked to address the Valedictory Session of the Seminar on "Welding for Energy Sector" conducted by the Indian Institute of Welding. I shall confine my address mainly to the Thermal Power Generation field.

Welding has progressively established its sway in the different areas of Power Generation. In the erection stage, most of the field work in Steam Generators like joining together the wall panels, connecting the individual tubes to the stubs in the drum, joining the different sections of a long header, building up of complete super heaters, economizers and reheaters out of the partially fabricated assemblies despatched from works etc, are done by welding. Flanged joints have given way, in high pressure piping, to welded joints. Valves are welded on the pipe lines and then bonnet joints on most of the valves are welded. By this progressive intrusion of good welding practice, leakage in steam and water lines have drastically come down and the availability of the plants have gone up considerably.

In the turbine generator area, the big casings like turbine casing, generator casing etc, are fabricated from formed plates and completed by welding. In the case of Power House and other structures, what earlier used to be joined by rivets, and later by bolts are gradually giving way to welded joints, wherever possible. In the electrical area, many precision pieces like high current flowing bus bar sections are joined by aluminium welding.

It is however in the operational stage of a Power Station that a station engineer becomes more and more dependent on welding for repairing and restoration of damaged parts and looks for such welding that can do the repair either without entailing a shut down, or shutdown for a small period.

Leakage of pulverized coal pipes between the pulverizer and the coal burner is a big hazard in any Power Station and has been instrumental in causing destructive fires in a number of power stations. Although manufacturers, both Indian and International, have at various

times offered different materials and composite structures for straight pipes and bends, the result has not been very encouraging. Power Plant Managers look to the Indian Institute of Welding to solve the problem, so that the hazard and nuisance is reduced.

In the coal processing area, comes the Coal Pulverizers. Due to the erosive nature of Indian coal, grinding parts of pulverizers, whatever be the type, wear out 4 to 5 times faster than their anticipated life in Western countries. Replacement is very costly and frequent replacement affects the availability of the equipment very badly. It would help the Power Stations immensely if a proper process of welding in-lay of these worn-out components can be devised that can both restore them to health and render them capable to give longer time between replacements or repairs.

Another crucial area is the different valves. They suffer wear on seats, discs, stem, bonnets and bodies. As a result, a valve may start passing the fluid that

it is expected to hold tight, or the fluid may start leaking outside, both of which conditions are unwelcome for continuity of service. No good service organization, in my knowledge, is there that takes in assorted worn-out valves and reconditions them to proper shape. The basic steps necessary in such repair are welding, machining and heat treatment, and we look to the members of the Indian Institute of Welding to come out with such service.

I.D. Fan, runners and casings, is another area requiring heavy maintenance. Although the incidence of such erosion has come down after introduction of electrostatic precipitators, yet it will be in order if a repair procedure could be evolved that restores both the casing and the runner in a short time and with extended life. Such similar service is required in the area of circulating water and other deep well pumps.

The last area I would like to emphasize is the area of Steam Turbines and Boiler Feed Pumps, both high speed precision rotating machines.

Boiler Feed Pump (and also condensate Pump) rotors/runners suffer erosion primarily in the 1st stage impeller due to

cavitation generally due to low load operation. It should be possible to restore those impellers by proper welding practice. The job has to be very precision as any disengagement of weld material will play havoc in the succeeding stages. The clearance in these equipment is very small.

In the turbine, the repair areas are the various valves, starting from Main Stop valves, Governor Control Valves, Extraction Valves, Reheat Stop Valves, Interceptor Valves, and various valves in the servo motor systems, etc.

Turbine rotors suffer erosion in the blades of the different stages, and also breakages in stray blades. A safe system has to be developed by which worn-out blades could be restored by weld deposit, and if there is damage to a few blades in any one stage a method of building up of blade tenons, so that it could be again riveted with the shrouding, may be thought about. If a blade cannot be restored in this way, the full packet of blades have to be taken out, but there should be a way by which only the damaged blades are either restored or replaced and the rest put back in the same shrouding, in place of the present practice of replacing the total number of

blades in the stage and using a new shrouding band after proper marking and punching holes to take in the tenons.

Bent turbine rotors are a problem in many stations. There will always be found one or more rotors complete in all respects, but discarded due to the run-out on the shaft being higher than permissible. A great public service will be done if the metallurgists in the I.I.W. can devise a method of straightening such shafts by selective application of heat and load with the rotor placed in its cradle.

The diaphragms and nozzles forming the stationary blades of the steam turbine also suffer extensive erosion and breakage due to impact of such eroded material on the subsequent stages. Proper welding technique will restore such nozzles and diaphragms at reasonable cost and within the period of overhauling of the turbine. Presently such nozzles or diaphragms have to be completely replaced and as such damage generally comes to the knowledge of the Power Station only after the machine has been opened up. Procurement of a replacement set takes a very long time and causes extended outage of the machine.

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Editor