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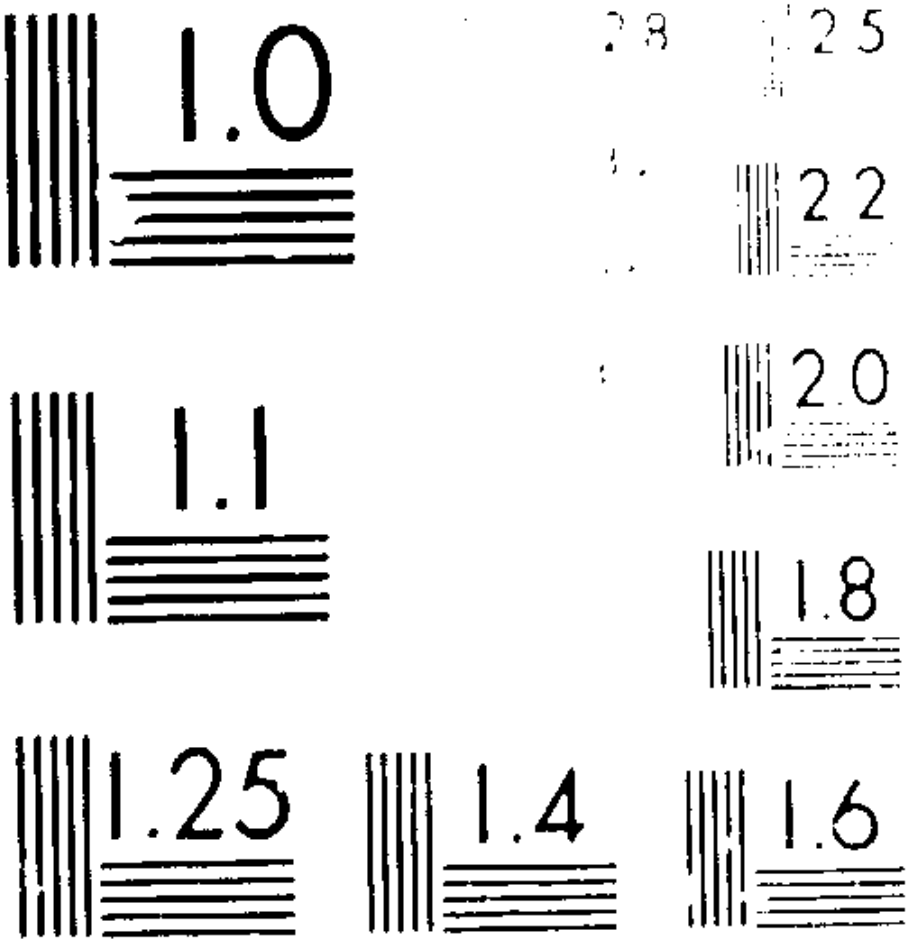
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A CENTRE FOR CO-OPERATIVE RESEARCH - WELDING RESEARCH INSTITUTE *

by

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1.0 INTRODUCTION

Industrialisation is a process having several unique characteristics and passes through different phases. Amongst the various inputs essential for the balanced growth of the industry are technology and infrastructure. As the industrialisation progresses the need for advanced skills, newer technological inputs need continued updating.

2.0 RESEARCH AND DEVELOPMENT IN DEVELOPING COUNTRIES

Research and development plays a crucial role in the process of industrialisation in the developing country. The socio-economic and technological advancement of the developing country depends a great deal upon the extent of R&D efforts and the end use of the R&D results. There has been an increasing awareness amongst the developing countries to evolve an integrated approach to the technological inputs. The developing countries have realised that it is essential that to sustain the industrial growth, various means of appropriate technology transfer be made available to the country. This is being channelised largely through suitable selection and adoption of foreign aid, Multi-National Corporations, Patents purchase and indigenous research institutions. The issues related to the technological advancement have been taken up at various national and international meets.

As a result of this, there has been growing awareness for strengthening indigenous technical infrastructure to adapt, adopt and assimilate the imported know-how. Efforts are being taken at the plant, regional and national levels to set up research centres. The respective governments and UN bodies are playing pivotal roles in fostering support and monitoring the growth of

indigenous R&D institutions. Welding Research Institute is one such institution set up as a result of successful efforts of Government of India, UNDP/UNIDO and a large public sector industry like BHEL.

3.0 WELDING RESEARCH INSTITUTE:

3.1 Conception

The socio-economic scenerio in India has visibly changed during post independence era with a gradual but definite shift from agricultural nation to industrialised country. With a growing emphasis on heavy industries during this period, the need for developing welding as a discipline in well recognised. The ever increasing demand for sophisticated welding technology called for establishment of a National Welding Research Institute.

3.2 UNDP ASSISTANCE

As a result of this, WRI was set up as a joint venture of Government of India and UNDP/UNIDO under BHEL. Setting up of such a national institute has been envisaged as a 'close link' with the industries for introducing appropriate and newer technologies. The Institute has been set up with an initial outlay of Rs.178 lakhs as Indian contribution and US $ 2.022 million as UNDP contribution. The UNDP/UNIDO contribution has been mainly for the input of sophisticated welding and laboratory equipment for undertaking R&D, consultancy, training and documentation activities in the field of welding science and technology.

3.3 Growth

The Institute over past few years since inception has built up an impressive reservoir of manpower and sophisticated equipment. The growth of the

Institute is planned with a predominent importance for creating a strong base for undertaking applied research in welding and metallurgical investigations and allied fields for the effective utilisation of the available equipment and manpower. The Institute has been laying strong bias on the applied research projects and industry sponsored consultancy, short/long term projects.

Since the start of the equipment and manpower buildup Institute, has undertaken large number of consultancy/research projects in diversified fields such as process development,machine development, failure analysis, metallurgical investigations, weldability studies, consumables development etc. For the effective and wider application of successful projects, Institute has been processing completed projects for technology transfer for commercial exploitation.

As a result of the expertise built-up, institute has been successfully able to develop SAW high speed fluxes. These consumables have shown superior metallurgical and technological characteristics/properties and is an excellent import substitution.

The Institute is strongly propogating the concept of weldability certificate for all indigenous steels. With enormous efforts, the institute has developed a total package test programme for evaluating weldability of steel. The institute has entered into a 2 year contract with Steel Plant in India for weldability evaluation of their newly developed microalloyed steels. The institute's similar proposal for IS 226 & IS 2062 has also found favourable response from ISI & Steel manufacturers.

A breakthrough has been achieved in the substitution of conventional pressure vessel material by a newer and superior material. Welding procedure establishment and weldability studies are being carried out on this new micro alloyed steel which is hitherto not used in our country. The metallurgically superior material, when used leads to a great deal of material savings, ease of welding and superior metallurgical properties.

Elaborate test programmes are being undertaken at the Institute to study fracture toughness properties of various materials, establishing correlation between COD & JIC values and study the role of inclusions in IS 2062, IS 226, on fracture toughness. The sophisticated equipments such as Instron Static-dynamic Testing machine, Rehille High Temperature Tensile Testing machine, Pellini Nil-ductility Tester are specially tooled up to meet the requirements of these tests.

An extensive support is being given to the industries in the field of failure analysis and metallurgical investigations as consultancy services. Apart from mechanical testing equipment, optical and electron microscopy is extensively used for various requirements such as consumable evaluation, fractography, weldability studies, etc.

3.4 II Phase Expansion

With an excellant support from GOI, UNDP/UNIDO and enthusiastic response from the customer industries, WRI has now embarked upon the II Phase Expansion. II Phase Expansion has been mainly envisaged to augment the facilities for metallurgical research, consumables development and advanced NDT laboratory

equipment like Holography, Accoustic Emission. The total outlay for 2nd phase is $ 2.185 million (UNDP contribution) and Rs 104.62 lakhs (Indian contribution) with which WRI would be a fully equipped Research institution.

4.0 INTERACTION

4.1 Forward & Backward Linkage

The institute has gained confidance and valuable experience in training, consultancy and R&D in the field or welding. The progress achieved by the institute in various fields has beer well appreciated by UNDP/UNIDO and customer industries. To keep itself abreast with the latest technology in the world, the institute is constantly in touch with national and international bodie . The institute is at the moment in close liason with welding Research institute, Bratsalva and plans to undertake mutual researh programmes. The institute is also an elected member of International Institute of welding since the year 1970.

4.1 WRI and the Developing Countries

To share the experience with developing countries the institute is planning training courses for engineers and specialists from countries of neighbouring region. The institute has also extended its services for setting up training centres and welding institutes in developing countries. The institute isalso in touch with UNDP/UNIDO for promoting the cause of TCDC and effect the technology transfer, exchange programmes, etc. WRI is open to cooperate & collaborate for mutual benefit not only for the industries in India but also to those in developing countries like ours, outside.

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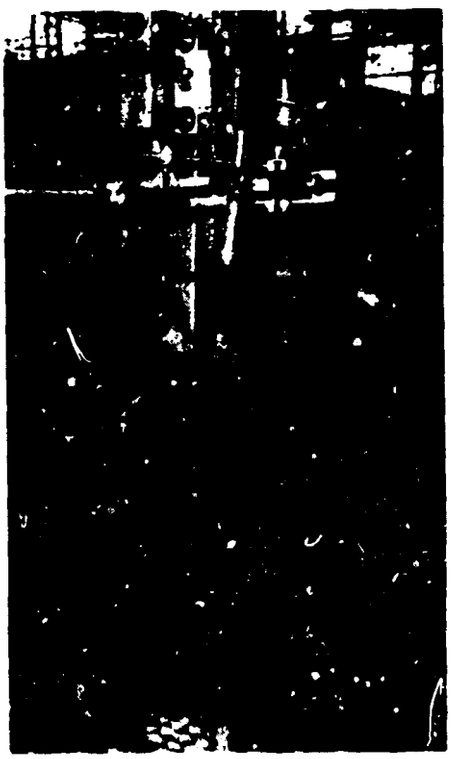
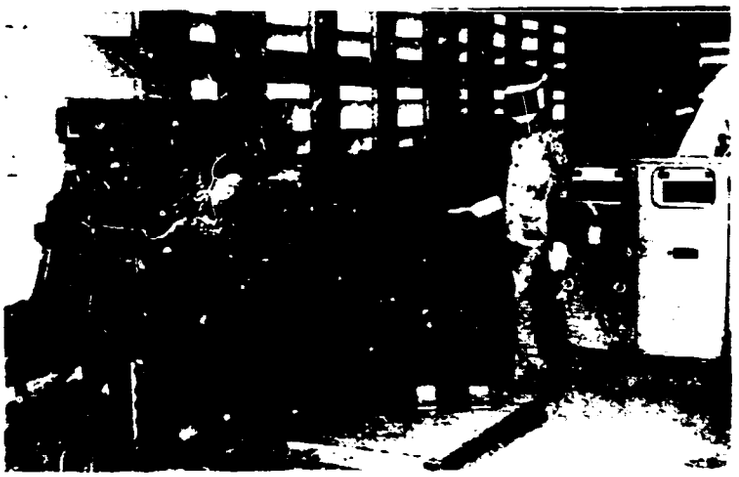
(1) WRI - CHOICEST PLACE FOR WELDING AND ALLIED FACILITY

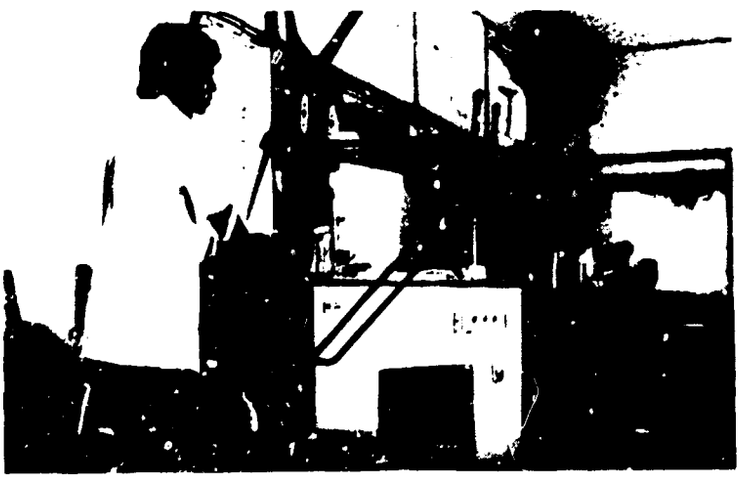


(2) PLASMA SURFACING FACILITY

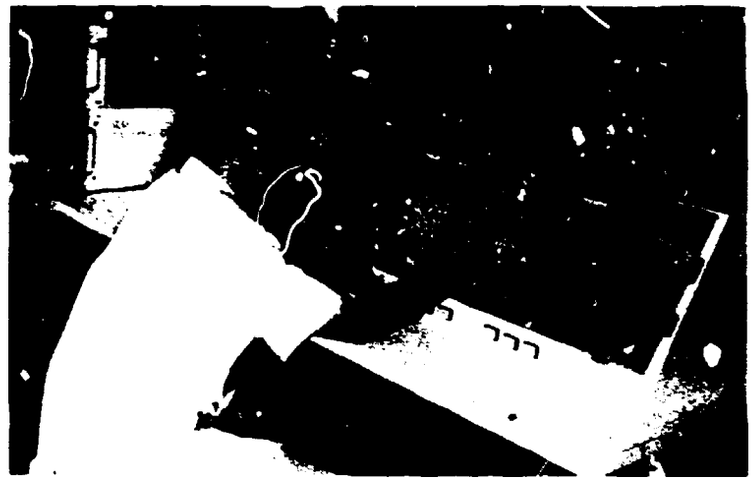


(3) FLASH BUTT WELDING OF TUBES IN PROGRESS

(4) HYDROGEN DETERMINATOR



(5) LOW TEMPERATURE IMPACT TESTING MACHINE

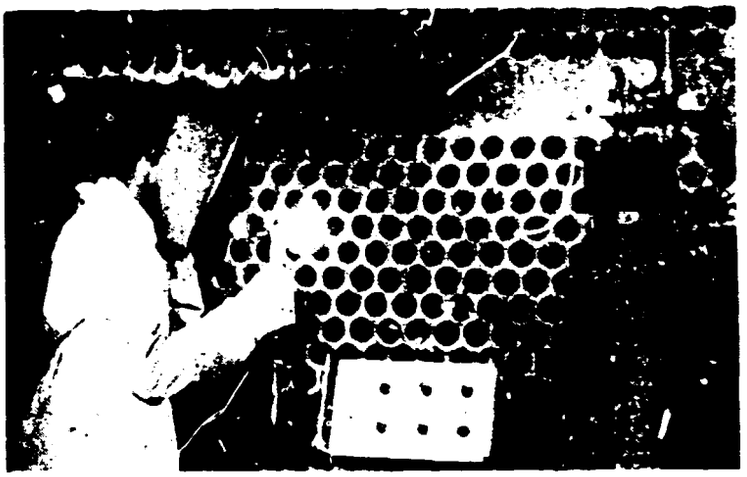


(6) SCANNING ELECTRON MICROSCOPE FOR FRACTOGRAPHIC ANALYSIS

(7) RIEHLE - ELEVATED TEMPERATURE TEST FACILITY

(8) FLAW DETECTION BY ULTRASONIC TESTING

(9) Y-TYPE CONSUMABLE INSERT MANUFACTURING MACHINE



(10) PULSED TIG WELDING OF TUBE TO TUBE SHEET

(11) ERC TEST RIG

(12) RECLAMATION OF CRACKED CHURCH BELL

(13) OPTIMALLY DESIGNED WELDED TRANSFORMER CASING