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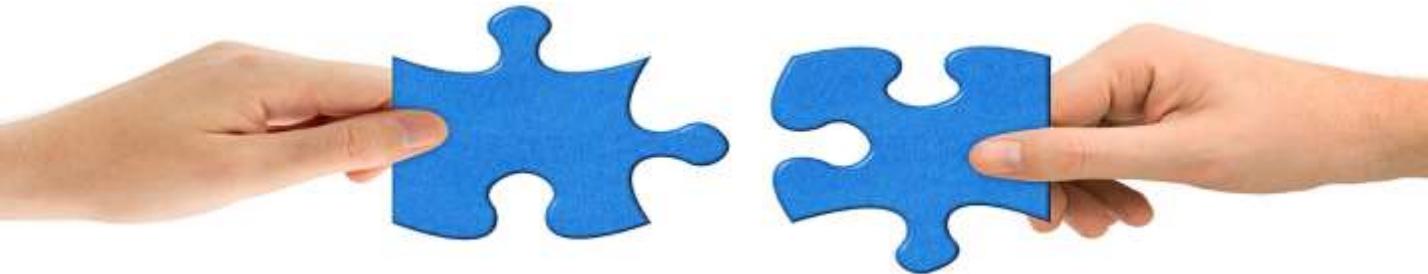


Confederation of Indian Industry



OVERVIEW OF THE WELDING INDUSTRY IN INDIA: CHALLENGES & APPLICATIONS

KNOWLEDGE PARTNERSHIP



BDB India Pvt Ltd, as India's leading Market Research and Growth Strategy developing company, has a history of serving its esteemed clientele for quarter of a century now, providing them world class management inputs for spectacular success in the global marketplace.

Today, intelligent and sustained hard work has equipped BDB with an upper edge.

With privilege of working for leading organizations who have trusted BDB again and again - many of which are among the largest business houses of India and the World. BDB have participated in setting up new businesses and in expanding existing ones; also assisted in identifying new opportunity areas and in evaluating their short, medium and long term commercial potential.

With research expertise in India, SAARC, SEA, South Asia, Middle East and Africa, BDB's analysis has helped structure new organizations and restructure old ones.

BDB now has the unique distinction of being the first Indian Market Research company to receive an ISO 20252:2006 certification.

CII is a non-government, not-for-profit, industry-led and industry managed organization, playing a proactive and pivotal role in India's development process.

CII works to create and sustain an environment conducive development of India, partnering industry, Government, civil society through advisory and consultative process...

Founded in 1895, India's premier business association has over 8000 members, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 200,000 enterprises from around 240 national and regional Sectoral industry bodies.

CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and strategic global linkages. It also provides a platform for consensus-building and networking on key issues.

With 66 offices, including 9 Centres of Excellence, in India, and 9 overseas offices in Australia, Bahrain, China, Egypt, France, Germany, Singapore, UK, and USA, as well as institutional partnerships with 320 counterpart organizations in 106 countries.

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PREFACE

Welding is a precise, reliable, cost-effective, and high-tech method for joining materials in manufacturing industries. In fact, no other technique is so widely used by manufacturers, in India, to join metals and alloys efficiently to add value to their products. Most of the familiar objects in modern society, right from buildings and bridges, to vehicles and medical devices, could not be made without the use of welding.

Welding today is applied to a wide variety of materials and products, using such advanced technologies as lasers and plasma arcs. The future of welding holds even greater promise as methods are devised for joining dissimilar and non-metallic materials, and for creating products of innovative shapes and designs.

Welding operation is most critical operation of any manufacturing process, and quality of welding has direct impact on quality of final product. Joining technology is an integral part of the manufacturing process and effort has been spent to develop and demonstrate the suitability of various processes for application into both design and structural fabrication.

Welding is the core of modern technology and it has gone through a complete evolution today, following the utmost precedence that machines have garnered in our lives. There is a rapid development in this industry and new methods are being discovered and added day by day. Welding is an ever growing discipline which presents challenges and work opportunities for new generations of engineers.

In India, welding contributes significantly to the GDP in several ways, such as welding intensive industries, auxiliary products, complementary goods, employment, and user industries.

The Indian welding industry was dominated by low technology and very rare technological innovation. However, in recent years, the demand of automatic and semi automatic welding production systems are rising.

Simultaneously, low budgets and recession have marked the ongoing popularity of manual, economical techniques.

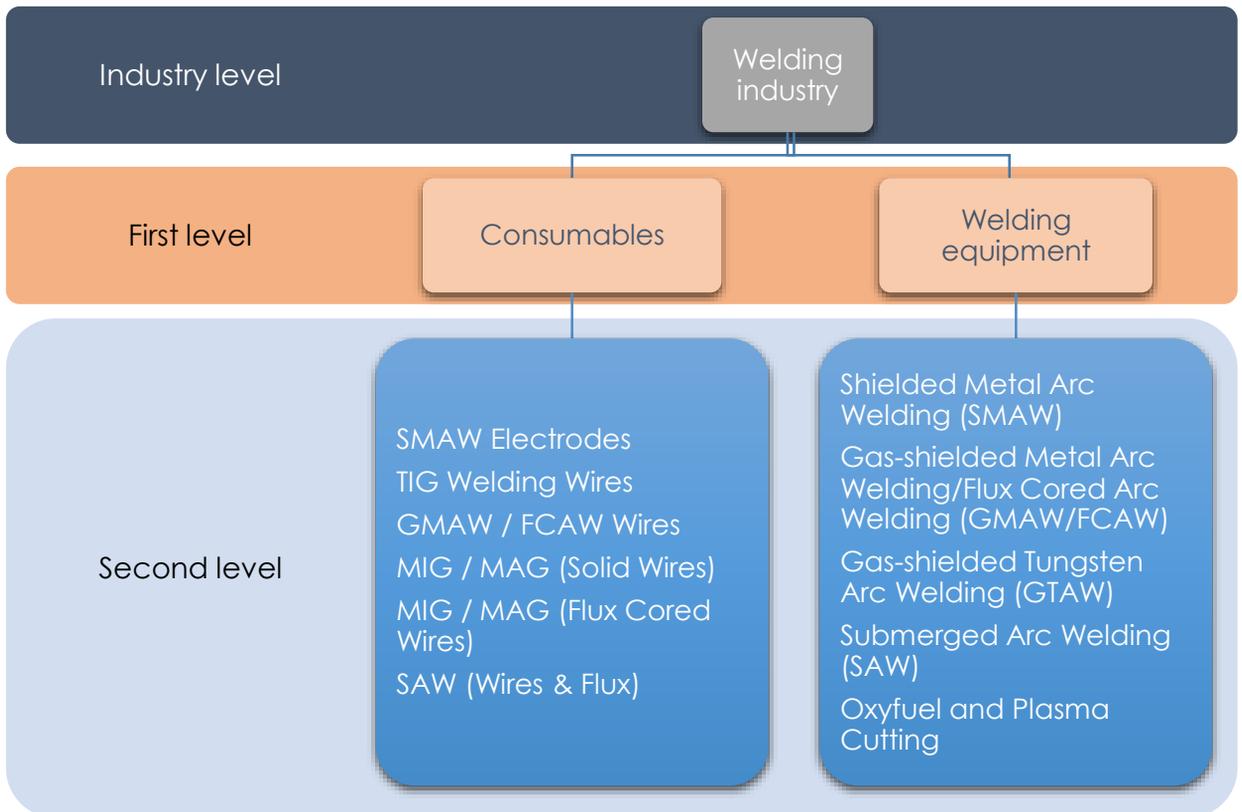
Increased FDI equity inflow in India has contributed to the rise in projects in automotive, offshore activities, oil and gas sector, ship building and heavy machinery industries. Many foreign automobile companies have set up their manufacturing units in India. This has positively affected the rise of consumables and welding equipment.

However, economic crisis has impacted the flow of FDI in India which may result in decline in demand of welding equipment over the short period. There has been an overall growth of about 10% in steel industry in India. The rising demand of steel has promoted the use of modern, unique, uses of steel, increasing the demand of welding equipment.

BDB has undertaken this study with support from CII focussing on macro market assessment of welding consumables and equipment market in India.

BDB team has conducted this study through selected interactions directly with industry leading companies in product value chain. This has enabled to give a holistic view of the prevalent market dynamics, highlight new trends and analyse opportunities.

INDIAN WELDING INDUSTRY



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INDIAN WELDING INDUSTRY



One of the big challenges faced by the local manufacturers of equipment in India is the considerable import of welding equipment.

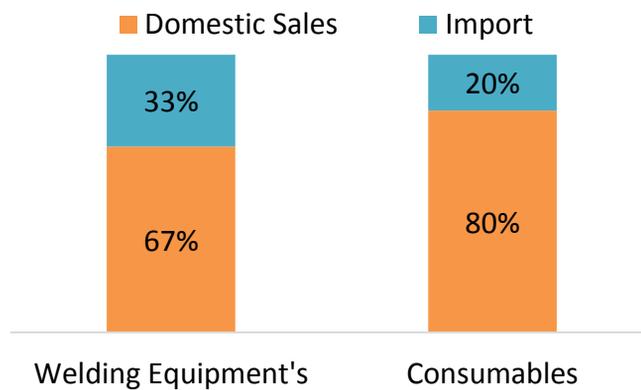
The increased imports has negatively impacted the market share of local participant in various industries such as shipbuilding, automotive and transportation and white appliances.

Another challenge faced by welding electrode plant is the unorganized sector that presently occupies nearly 50-55% of the market. Lack of standard specification and tedious approval process is resulting in the growth of unorganised sector.

Indian welding consumables and equipment manufacturers need to produce high quality and unique goods in order to stay competitive in Indian and international markets.

With increasing competition and lower profit margins, manufacturers need to improve their service, performance and delivery.

Market Segment by Source of Supply



MARKET LANDSCAPE - CONSUMABLES



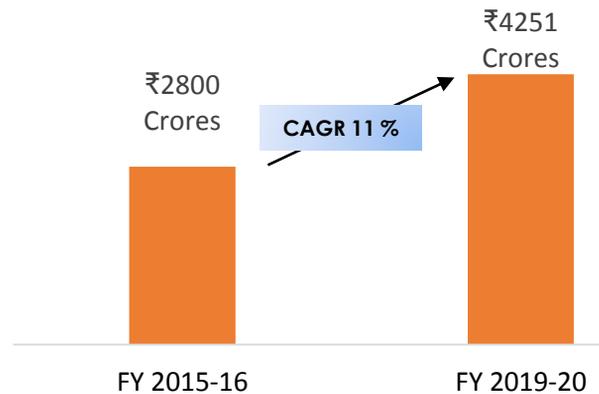
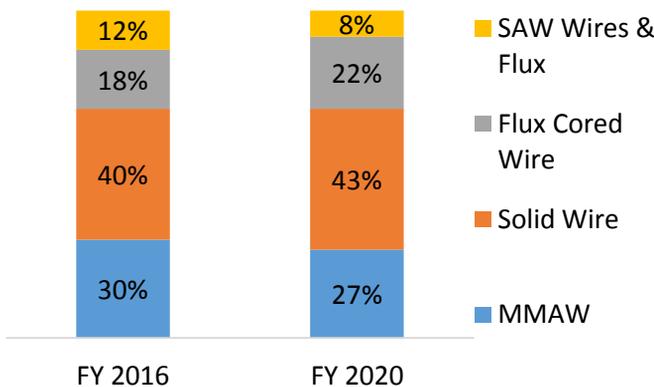
WELDING INDUSTRY
~ ₹ 4000 Cr



CONSUMABLE INDUSTRY
~ ₹ 2800 Cr

- Fragmented industry with 50% being controlled by unorganised players.
- Organised market is mainly controlled by established players like ESAB India Ltd., Ador Welding Ltd., D&H Welding Electrodes India Ltd., EWAC Alloys Ltd., etc.
- Robust outlook of the infrastructure sector , welding consumables market is expected to grow at a CAGR 10-11% over next five years.
- Continuous electrodes would witness higher growth compared to Manual Electrodes.

Robust outlook of the infrastructure sector , welding consumables market is expected to grow at a CAGR 10 - 11% over next five years



Stick electrodes are losing its market share to wires and fluxes to growing usage across the end-use industries and their advantages such as high deposition rate, strong welds, and suitability for outdoor work

MARKET LANDSCAPE - EQUIPMENT

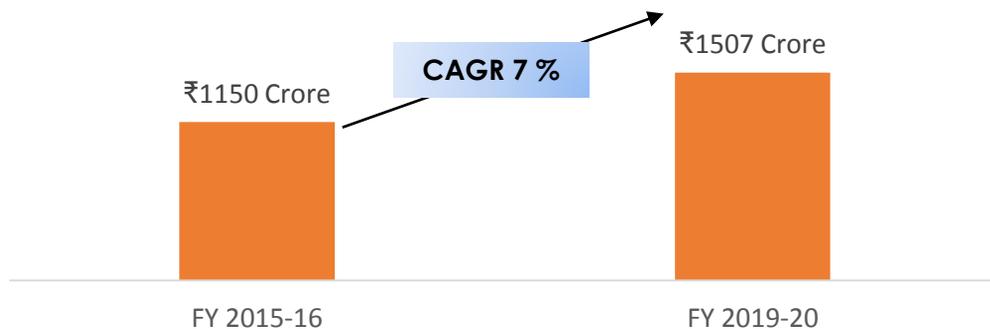
WELDING INDUSTRY
~ ₹ 4000 Cr

29% Equipment's
share

EQUIPMENT INDUSTRY
~ ₹ 1200 Cr

- Organised Market accounts for 40 - 45% while Unorganised accounts balance Market
- Companies such as ESAB India Ltd., Ador Welding Ltd., Linclon Electric Company India Pvt. Ltd., Kemppi India Pvt. Ltd., Miraj Electrical & Mechanical Co. Pvt. Ltd. & ITW India Pvt Ltd. (Miller) are the major established organised players
- Imports constitute significant portion of organised market
- The welding equipment industry is expected to grow at a CAGR of 6-7% over the next five years.

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MARKET SEGMENTATION

Heavy Engineering



- Witnessed a remarkable growth over the last few years driven by increased investments in infrastructure and industrial production
- The capital goods & engineering turnover in India is expected to reach US\$ 125.4 Bn by FY17
- The FDI inflows in the sector during April 2000 to March 2016 stood at around US\$ 3,068.1 million

- 6th largest producer in the world with average annual production 24 Million vehicles
- By 2026, India is expected to be the third largest automotive market by volume in the world
- Global OEM's ramping up investments in India to cater to growing domestic demand

Automotive



Railways



- 4th largest rail freight carrier in the world and network spans more than 66030 kms. making it the world's 3rd largest rail network
- 100% FDI has been allowed
- Indian railways envisages a prospective investment of USD 130.76 billion in the next 5 years

- USD 1 trillion investment projected for infrastructure sector
- USD 650 Billion investments in urban infrastructure estimated over next 20 years
- Government investment to develop 100 Smart Cities and 500 AMRUT Cities

Construction

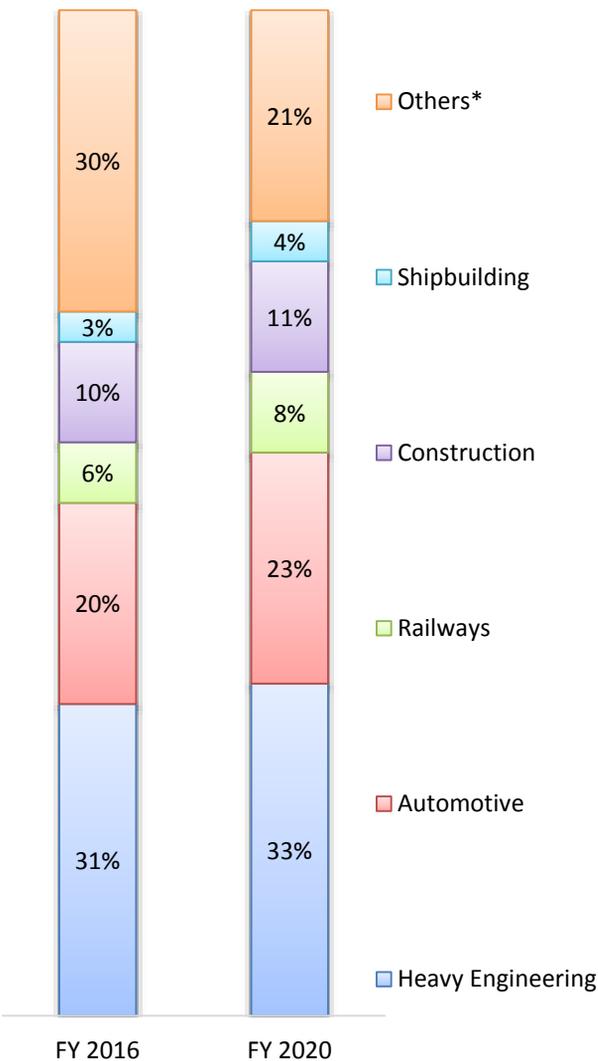


Shipbuilding



- One of the major contributor to economy of country
- With over 40% of India's fleet of ships in the 20 plus age group, which holds tremendous opportunity for India's shipbuilding and ship-repair industry

FUTURE OUTLOOK & NEW WELDING TECHNOLOGIES



Orbital TIG welding for joining of tube of more complex geometries

Growth in use of semiautomatic and automatic robots for efficient and qualitative welding

Orbital TIG welding, stud welding, robotic welding, and laser welding are some of the latest technologies that have been introduced to meet precision welding requirement

Robotics and automation are increasingly being deployed by industries to achieve welding quality and improve productivity

Modern processes like Hot wire TIG, Activated TIG, Narrow groove SAW, Tandem SAW and GMAW, Pulsed GMAW, ESSC with high speed fluxes, laser and hybrid laser, friction stir, thick and thin section joining, exotic and refractory metal joining, invisible welding, and ultra-thin wires joining have been introduced

Few new technologies like dynamic oxide control system for aluminium welding, intelligent gas control for large-scale savings in gas consumption, and intelligent arc control for automatic arc adjustment have been introduced

Nearly 45 - 50 patent filed and submitted by WRI and Laboratories from the year 2010 to 2015

CUSTOMER'S PERCEPTION & CHALLENGES



1 Lack of knowledge of end users

Due to lack of knowledge of its application and cost economies, to a large extent, higher productivity welding consumables like CO2 continuous welding wires and flux cored wires fail to find higher demand. In view of this it is pertinent to start vigorous marketing efforts by existing leading manufacturers of consumables and equipment to educate the users.

2 No technologies for low installed capacities

Majority of organised sector units have quite low installed capacities to enable them to use modern machinery set up like computerised batching plant, X-ray florescent tester, etc. The welding consumable manufacturers should arrange these technologies and try to adopt it for lower capacity plants if possible

3 Lack of testing facilities

Testing facilities and quality assurance systems are inadequate in India. Approval of inspection agencies, Indian and foreign, is for limited specific types of consumables. Quality and reliability of other varieties are dependent on Quality Assurance Systems of the manufacturer. The manufacturers need to be exposed to international practices in Quality Assurance Systems like ISO 9000, which are desirable, in order to face international competition. Third party labs

4 Lack of R&D

R & D effort in India for welding electrodes is fragmented among few leading manufacturers and WRI, Tiruchy. Very frequently research effort is being spent on already developed products. Majority of the manufacturers cannot offer to carry out research on their own.



INITIATIVES FOR SKILL DEVELOPMENT IN INDIA



India's working-age population will rise by 12.5 crore over the coming decade, and by a further 10.3 crore over the following decade. It is almost a cliché to say India is sitting on a demographic dividend. That is, with its growing young workforce, it can look forward to decades of high productivity, economic growth and upward social mobility.

By 2022, it is estimated that unless action is taken, there will be a gap of 10.3 crore skilled labourers in the infrastructure sector, 3.5 crore in auto and 1.3 crore in healthcare, to name a few.

Indian government has given a major impetus to skilling over the last few years.

To begin with, a clear national goal has been established — to skill and re-skill 500 million Indians by 2022 and the budget for skilling has been ramped up several-fold to more than INR 10,000 crore a year.

A National Skills Development Agency has been set up to coordinate various piecemeal training efforts of different ministries, state governments and industry.

Skilling and placement targets have been set at aggregate and Sectoral levels and a robust national tracking system is in place.

But targets and budgets are only part of the solution. What is more interesting are the innovative design and delivery models being set up to respond to job-market realities.

First, industry has been centrally engaged in designing the training curriculum and certification of trainees, so that trainees are taught the things they need for getting a job (a major weakness of previous government training efforts was a weak linkage to job-market needs). Twenty-eight sector skill councils, with industry in the lead, have been set up for this.

Second, incentives for youth to get trained and certified are being put in place. The Standard Training Assessment and Reward (STAR) Scheme has been launched, under which each trainee gets approximately Rs 10,000 upon completion and certification of training. More than 2,30,000 young people have been enrolled under the STAR incentive programme already.

Third, technology is beginning to be deployed to transform the training landscape. Various innovative models have emerged. As the example of “Velu the Welder” (and similar simulators, such as for driving) has shown, technology is being leveraged to make training safer, more cost-effective and more scalable. With highspeed broadband connectivity to every panchayat likely to become a reality in the next two years, technology-based skilling models will only become more valuable in scale and impact.

INITIATIVES FOR SKILL DEVELOPMENT IN INDIA



Fourth, existing government programmes are being adapted to make the youth job-ready. The National Service Scheme has been adapted to prepare youth for entrepreneurship opportunities by enhancing their IT literacy, financial literacy, English communication and other soft skills. This is already being implemented across 40 colleges. Industrial Training Institutes (ITIs) are being upgraded, many through public-private partnerships. For example, a world-class skilling centre has been established by the Delhi government in partnership with the Singapore government, adapting from the successful training models of Singapore, to train 10,000 youths per year.

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Fifth, new state-specific programmes that address unique challenges — like Udaan (for unemployed graduates) and Himayat (for entry-level service-jobs) in Jammu and Kashmir — are being scaled up. An end-to-end value chain — for identifying youth, training, placement and post-placement counselling and support — has been created. More than 20,000 young people have already been trained and placed in the state through these two programmes, and the target is 1.5 lakh over the next five years.

Of course, a lot more needs to be done and is on the cards. The single biggest reform in the works is the amendment to the archaic Apprenticeship Act, to make it easier for companies to hire and train apprentices. Apprenticeship has been a successful model of skilling youth in countries like Germany and Japan. This reform alone can increase the number of apprenticeships in India from the current 2.4 lakh to 30 lakh a year.

Two hundred community colleges are being set up within existing colleges and polytechnics to enable youth pursuing higher education to become more employable. Skill development is one of the activities approved for spending under Corporate Social Responsibility (CSR) as per the new Companies Act 2013.

India has made a tryst with its demographic destiny. Skilling its youth is giving it a chance to redeem this pledge.

SOME OF THE RESEARCH UNDERTAKINGS



DEVELOPMENT OF HIGH PERFORMANCE ROBOTIC WELDING FOR TUBE TO FIN WELDING USING TIMETWIN TECHNIQUE PROCESS

TECHNOLOGY ESTABLISHED FOR ROBOTIC WELDING OF HRSG MODULE

ROBOTIC WELDING TECHNOLOGY ESTABLISHED FOR HIGH CAPACITY TRANSFORMER TANKS

ESTABLISHMENT OF AUTOMATED WELDING SYSTEM FOR MANUFACTURING OF BIFURCATE COMPONENTS

AUTOMATED GMAW PROCESS ESTABLISHED FOR WELDING OF HAND HOLED PIPE TO DISHED END (HEADER)

GMAW / FCAW TECHNOLOGY FOR WELDING OF PIPING JOINTS FOR BOILER & TURBINE ASSY AT SITE

ESTABLISHMENT OF ACTIVATED TIG WELDING FOR HIGH WALL THICKNESS TUBES

PHASED ARRAY ULTRASONIC TESTING PROCEDURE FOR MIAB WELDED TUBES

Research & Development activities are driven by either the top 5 companies or largely by the Welding Research Institute of India , Tiruchirappalli, in India.

CONCLUSION



1

Alloy materials will have largest demand growth in consumable market

Alloys present better mechanical properties, like Nickel with resistance to oxidation, Chromium with carbide stabilisation, Aluminium for weight reduction, copper for corrosion resistance, and so on.

2

Limited R&D and testing facilities are hurdle to industry growth which needs to be addressed at earliest

With almost 45%-50% of manufacturers in un-organized segment the R&D inclination towards material, technology and techniques is very minimal and limited. Public/ Third party facilities in this direction can prove to be a good value add for largest welding community.

3

Selected segments will drive the demand of welding consumable and equipment

With improved focus on manufacturing and infrastructure allied segments like Heavy Engineering, Power, Transportation, Automotive will be the demand drivers in India

4

Increasing price of steel is expected to impact the prices of welding consumables and thereby the revenue

With increase in raw material cost there is a direct impact on them manufacturing hence for the larger unorganized community the competitiveness in market place reduces thereby affecting the overall revenues

5

New Govt. initiatives and overall technology advancements to drive the demand

With advent of Govt. initiatives like Make in India, Smart cities, Cluster development programs, SME support programs and due to newer technologies and concepts of Smart manufacturing, IOT, Robotics the welding community are optimistic of the future growth

6

Need for skilled labour

Training and development of skill is of utmost importance. Govt. has planned for spending of INR 10,000 Cr a year for skill development. Along with the Govt. initiatives even the private sector should have internal training process in order to enhance the overall skill level.



For further information :

BDB India Pvt. Ltd.

BDB India Private Limited
104, Pentagon 1, Magarpatta City,
Hadapsar, Pune - 411 013,
Website : www.bdbipl.com

Mr Manish Kulkarni
Director – Strategy & Business
Development
Email: mk@bdbipl.com

Tel: +91 20 3056 0700

CII Naoroji Godrej Centre of Manufacturing Excellence

Godrej Station-Side Colony, Opp Railway
Station, Vikhroli (East), Mumbai - 400 079
Website: www.cii.in

Ms Sandhya Satwadi
Senior Director
Email : Sandhya.Satwadi@cii.in

Ms Sangita Das
Deputy Director
Email : Sangita.Das@cii.in

Tel: (022) 2574 5146 / 5148