



DRIVERS & TRENDS

The heavy industry segment covers a wide range of applications. Windtower manufacturing, beam manufacturing and earth moving equipment fabrication are amongst the most important application areas.

Despite the variety of applications, there are common welding trends that apply in all of these industries:

- Higher productivity through higher deposition rates
- Higher productivity by means of achieving lower defect rates and fewer finishing tasks (grinding)
- Better traceability of the welding parameters

APPLICATION REQUIREMENTS

Submerged Arc Welding, Flux Cored Arc Welding and Gas Metal Arc Welding are the dominating processes in the Heavy Industry. Required mechanical properties must be achieved in the as welded conditions.

LINCOLN SOLUTION

As a full line consumables and equipment manufacturer, Lincoln Electric offers turnkey solutions for Hard Automation applications and works together with the major robotics fabricators to provide Flexible Automation solutions.

Lincoln Electric's solutions include :



- ✓ A full range of consumables covering all welding processes
- ✓ Technical support for consumables selection and WPS development
- ✓ Dedicated power sources for Robotic and Hard Automation
- ✓ Robust and industry-proven Hard Automation equipment such as column & booms, rotators, positioners and all required accessories
- ✓ Technical support for equipment set-up, start-up and follow-up

HARD AUTOMATION AND ROBOTICS

Lincoln Electric offers a full line of Hard Automation welding manipulators using a complete solutions approach. Focusing first and foremost on the welding processes, the manipulators and accessories have been developed in order to meet the requirements of the process.

Lincoln's welding automation experts work with customers to identify the key welding performance and quality criteria that are most important, and then suggest the appropriate Robotic options for review by the customer. Furthermore, a wide spectrum of pre-engineered systems is available to meet virtually any fabrication need.



HEAVY INDUSTRY

EQUIPMENT

SAW :
POWER WAVE® AC/DC 1000®



Different than any SAW power source available in the market, one of the numerous advantages of the Power Wave® AC/DC 1000® SD is the fact that the phase angle between several machines can be adjusted as wished. Therefore, it allows the end user to set up very stable multi-wire welding procedures by controlling arc interactions.

FCAW / GMAW:
POWER WAVE® 655R



The Power Wave® 655R is designed for Robotic applications. Its fast response time provides extremely good arc stability. Moreover, the Arclink® and Devicenet® communication protocols make this machine easy to integrate with any of the well known Robotic systems. The Power Wave® 655R is the recommended source for the Tandem MIG® process

CONSUMABLES

Within the wide range of Lincoln's consumables portfolio, some products are uniquely suited for Robotic applications:



1) For GMAW: **Supramig® and Supramig Ultra®**. Superior feedability and arc stability have made these solid wires the premium choices of many demanding customers.

In order to offer the most efficient welding solution, Supramig® and Supramig Ultra® are available in 250 and 500 kg AccuTrak® drums minimizing change-over time while increasing effective on-stream manufacturing time. Time saving can be further increased by using the Lincoln patented **Never-Ending Wire** accessories.



2) For FCAW: **Outershield® MC 710-H**. This metal cored wire has been improved to respond to the most stringent Robotic **feedability** requirements. Available in 200 kg AccuTrak® drums in 1.2, 1.4 and 1.6 mm wire diameter, this wire also provides **extremely low diffusible hydrogen** levels in the weld metal. This feature can significantly reduce the risk of cold cracking when welding thick and highly restrained plates.

The Submerged Arc Welding process is broadly used with Hard Automation systems. Numerous Flux & Wire combinations can be selected based on the joint configurations and the required properties. The most commonly used products in the Heavy Industry segment are :

FLUX	Designation (AWS/EN)	PRODUCT FEATURES	PACKAGING
P230	S A AB 1 67 AC H5	Up to 3 arcs applications. Widely used by Wintowers manufacturers. Suitable for both 2-run and multi-run techniques. Impact down to -40 C with the appropriate wire	PE Bag : 25kg Al bag (SRB) : 25kg Metal drum : 40kg
960	S A AB 1 66 AC H5	Usually used in single/twin arc process. Excellent operating characteristics. Typical application: Beam welding	Metal drum : 250kg Big Bag : 500-600-800 and 1000 kg
WIRE	Designation (AWS/EN)	PRODUCT FEATURES	PACKAGING
L50M/LNS133U	EH12K/S3Si	High level of Mn content. Recommended on dirty plates. Suitable for both 2-run and multi-run applications. Best impacts properties obtained in Multirun technique (down to -40°C)	Standard spool : 25kg Big spool : 100kg Wooden reel : 300kg
L70/LNS 140A	EA1-EA2/S2Mo	Impact properties down to -40°C in 2-run technique even with high heat input procedures	Speed-Feed drum : 350-400kg
LNS140TB	EG/Sz	Micro-alloy wire to provide excellent impact properties when used in 2-run technique with semi basic fluxes	Metal coil : 1000kg Accutrak : 1000kg