

Heavy Fabrication

# BRIDGING THE GAP

## Welding Challenges Facing Heavy Fabrication and OEM Equipment Manufacturers

Welding is foundational to the manufacturing of heavy equipment, whether it's earthmovers, mining machinery, or agricultural OEMs. In these sectors, structural integrity, durability, and long-term performance are non-negotiable. Every weld must meet stringent standards to ensure safety under extreme stress and demanding environmental conditions. As machinery grows in complexity and scale, so does the need for precise, high-quality welds that can withstand years of heavy-duty use.

However, companies across the U.S. are facing escalating challenges in their welding operations that impact productivity, quality, and workforce sustainability.

Lincoln Electric is at the forefront of helping manufacturers overcome these hurdles. Let's explore how our array of cutting edge technologies and solutions are playing a vital role in helping manufacturers address these challenges.



# BRIDGING THE GAP WITH LINCOLN ELECTRIC

## SKILLED LABOR SHORTAGES

The shortage of skilled welders is felt acutely in heavy industries. These roles demand advanced capabilities—such as proper parameters and bead placement on thick plate and complex multi-pass welds—that few in the workforce are trained for. With older welders retiring and fewer entering the trade, the talent gap continues to grow. This shortage not only slows down production but also increases the risk of weld defects, rework, and safety concerns. To stay competitive, manufacturers must find ways to upskill their existing workforce and attract new talent into the field.



## HOW LINCOLN ELECTRIC HELPS?

Lincoln Electric offers comprehensive training solutions through its Welding Technology & Training Center and Lincoln Electric Education Partner Schools (LEEPS) program. They also provide advanced virtual welding simulators like the VRTEX® system to accelerate skill development safely and effectively, helping manufacturers onboard new talent faster.

See link below for further information:

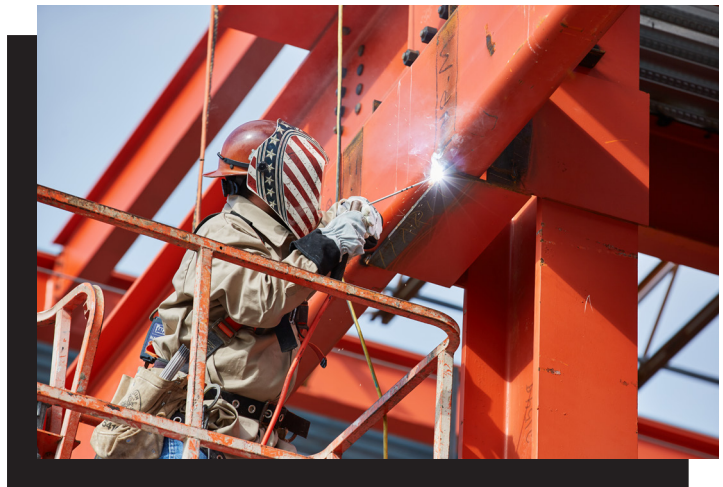
[Virtual Welding Simulators - Lincoln Electric Education Products](#)



# BRIDGING THE GAP WITH LINCOLN ELECTRIC

## MIGRATION TO LIGHTER COMPONENTS (LOW ALLOY MATERIAL) FOR IMPROVED FATIGUE LIFE

The materials used in mining, construction, and agricultural equipment continue to evolve as OEMs focus on making structures lighter with improved fatigue life by implementing high-strength low-alloy (HSLA) steels—require precise welding processes. The potential for issues like distortion, cracking, penetration consistency, and meeting mechanicals are increased when the welding is conducted without the right expertise or tools. These challenges are amplified when dealing with complex geometries. As material technology advances, so must the welding techniques and equipment that support them.



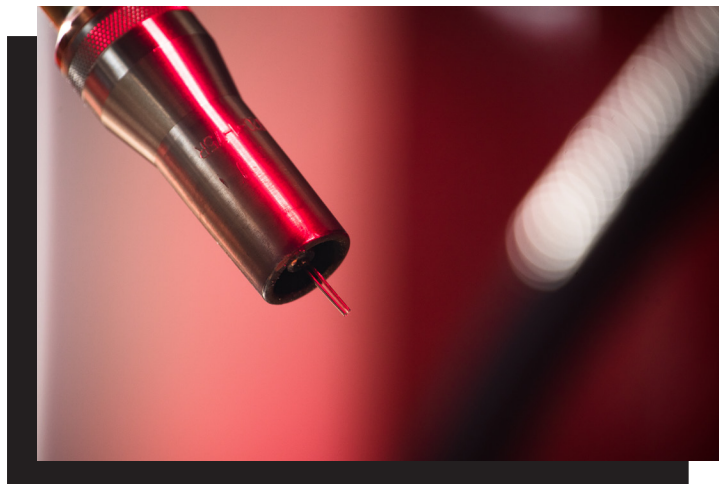
## HOW LINCOLN ELECTRIC HELPS?

Lincoln's high-deposition welding processes such as HyperFill® are designed to increase productivity and improve first pass yield by increasing the penetration profile on thin to thick sections while helping to minimize welding distortion. This technology allows for faster travel speeds and consistent weld quality, reducing rework and production downtime.

See link below for further information:

[The HyperFill Solution Overview](#)

[HyperFill FCAW Strike Brochure](#)



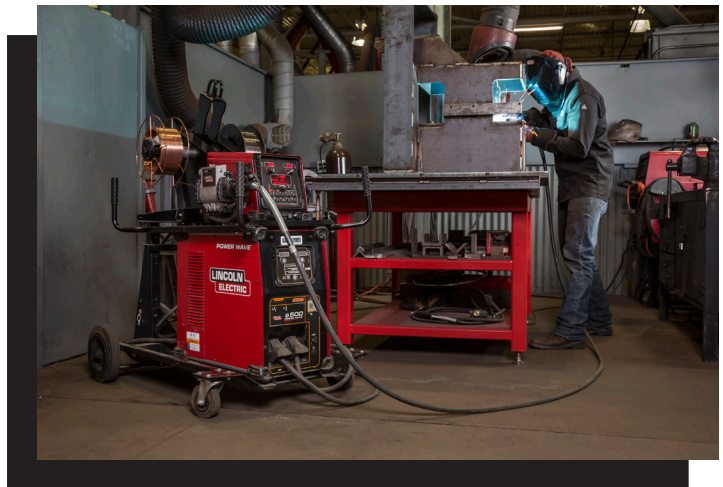
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## DEMAND FOR QUALITY AND CONSISTENCY

As the demands on mining, construction, and agricultural equipment continue to grow, original equipment manufacturers (OEMs) are increasingly turning to advanced materials like high-strength low-alloy (HSLA) steels. These materials offer the dual benefits of reduced weight and enhanced fatigue life, making them ideal for modern structural applications. However, their use also introduces new challenges in fabrication—particularly in welding. Issues such as distortion, cracking, inconsistent penetration, and difficulty in meeting mechanical property requirements can arise without the proper expertise, processes, and tools.

To address these challenges, the Power Wave® advanced process welding systems provide a comprehensive solution. These systems combine precision arc control, real-time data monitoring, and application-specific waveforms to help manufacturers adapt to increasingly complex production requirements. By integrating automated reporting and traceability features, they not only help fabricators meet stringent quality standards but also simplify compliance documentation. This level of control and insight is essential for working with evolving materials and maintaining the structural integrity and performance demanded by today's heavy equipment industries.

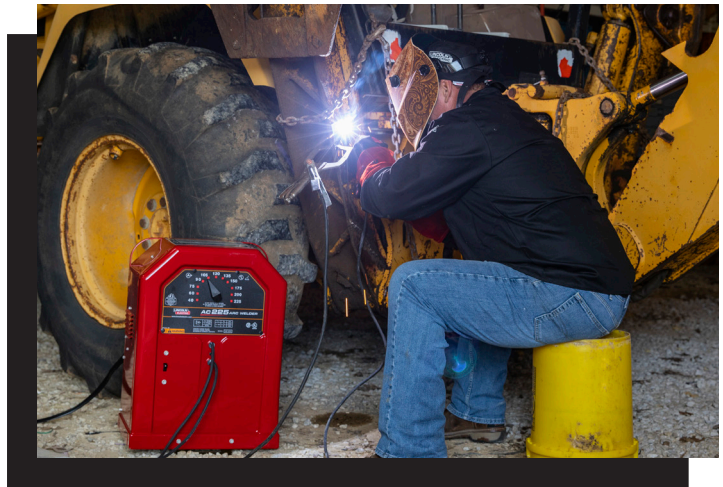
[Power Wave Product Overview](#)



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## INCORPORATION OF AUTOMATION IN MANUFACTURING

While robotic welding and automation are common in high-volume industries, many heavy fabrication shops have been slow to adopt due to the complex, low-volume, high-mix nature of their work. Heavy equipment fabrication often involves large, unique components not easily adapted to traditional robotics. Still, some level of automation is crucial to maintain throughput and quality—especially with limited labor. Additionally, there's often a cultural resistance to changing legacy manual processes that have “worked for decades.”



## HOW LINCOLN ELECTRIC HELPS?

Lincoln's Cooper™ welding cobots serve as the bridge to custom robotic systems allowing manufacturers to automate high-deposition welds even in medium-mix environments. Their user-friendly interfaces and compact footprints make them ideal for smaller operations hesitant to invest in large-scale automation.

See link below for further information:

[Cooper Welding Cobots | Lincoln Electric](#)



# BRIDGING THE GAP WITH LINCOLN ELECTRIC

## MODERNIZE WELDING PROCESSES WITH LINCOLN ELECTRIC

Heavy Fabrication and OEM equipment manufacturing face a perfect storm of welding challenges—from labor shortages and cost pressures to increasing quality demands. Forward-thinking companies are turning to technological partners like Lincoln Electric to help modernize their welding processes, boost efficiency, and prepare for the future.



### Conclusion

By integrating high-deposition welding technologies, intelligent automation, and skill-building resources, Lincoln Electric is helping to close the gap—empowering manufacturers to produce stronger, more reliable equipment faster and more cost-effectively.

CUSTOMER ASSISTANCE POLICY – The business of Lincoln Electric is manufacturing and selling high quality welding equipment, automated welding systems, consumables, and cutting equipment. Our challenge is to meet the needs of our customers, who are experts in their fields, and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or technical information about their use of our products. Our employees respond to inquiries to the best of their ability based on information and specifications provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment, or to provide engineering advice in relation to a specific situation. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or communications. Moreover, the provision of such information or technical information does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or technical information, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose or any other equivalent or similar warranty is specifically disclaimed.

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