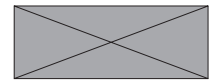


WELDING



Out-of-Box Innovation Driving Performance and Superior Results

Surerus Murphy Joint Venture leads the way as a contractor in innovation in the welding industry, providing modernized welding equipment and experience that are driving advancement in providing a quality end-product for clients in the construction industry.

Surerus Murphy owns its own specialized collection of mechanized M300C external welding units known as “welding bugs” that provide consistent welding parameters to produce repeatable weld quality with a low-hydrogen weld process. The result is fewer weld repairs and the elimination of hydrogen-induced cold cracking imperfections.

Mechanized low-hydrogen welding improves performance and reduces cost by alleviating 24-hour hold of Non-Destructive Testing (NDT) delays. The mechanized M-300C units are compact and versatile and can be used in remote tie-in applications. Surerus Murphy’s compilation of this specialized equipment means that it can be deployed throughout cross-country projects, enabling Surerus Murphy to have increased production and higher quality field welds without outsourcing equipment to a subcontractor.



M300 in progress



Tie-in rig (wheeled units) performing above ground welding

M300C UNITS PROVIDE QUALITY AND EFFICIENCY:

- M300C units are mechanized and produce precise control of welding parameters (travel speed, oscillation, voltage, etc.).
- Mechanized systems reduce the potential for human error.
- M300C units have minimal set-up time.
- Mechanized systems eliminate welder fatigue.
- Mechanized systems reduce labour costs by reducing crew sizes required to perform like welds.
- The M300C units’ low-hydrogen process leads to fewer weld faults and costly weld repairs.

OTHER WELDING PROCESSES AND TOOLS ARE OPTIMIZED FOR RURAL WELDING CONDITIONS:

- Customized welding rigs can travel to remote locations in inclement weather.
- Customized rigs are agile and durable, enabling welding in difficult terrain.
- Protective covers on the customized rigs providing shelter to protect the weld from outside elements and assure weld quality.
- Tie-in rigs (wheeled units) are durable and highly maneuverable with little required set-up time.
- Tie-in rigs have 40-feet of reach for performing welds in excavations.

GLOBAL ADVANTAGE:

- One of Surerus Murphy’s parent companies, the UK’s Murphy Group, has worked on some of the most challenging and complex infrastructure projects globally.
- Surerus Murphy has access to Murphy Group’s global welding technical experience, best practices improvements and welding personnel expertise.



WELDING BY THE NUMBERS

Surerus Murphy owns 100 CRC-Evans M300C units for mechanized welding:

- mechanized welding ease of operation by welders once properly trained by SMJV technicians
- higher production rate
- 100% low hydrogen process when used with the RMD root/hot pass (semi-automatic process)
- low repair rates (under 3%)
- less welding arc time and more production welds completed per day
- less welder fatigue due to optimizing weld arc time and mechanized operation

Surerus Murphy has invested in the development of 22 six-wheel drive road trucks and 5 units on tracks for an industry-leading innovative approach to semi-automatic tie-in welding:

- Introduced semi-automation to tie-in welding by custom-building mobile tie-in welding rigs for any terrain.
- A picker crane is installed on each rig providing telescopic lifting capabilities on safety positioning welding shelter and all associated welding equipment from the mobile platform onto the tie-in location for vastly improving set-up speed and, eliminating the need for manual handling of equipment up-and-down ladders into bell-hold excavations.
- Each unit has an aluminum enclosure with controlled ventilation, lighting, equipment, and tool storage:
 - creates a clean and safe environment
 - protects the welding process from the elements
- Track units can operate on slopes up to 35° and the deck can hydraulically compensate the angle, maintaining a level platform for operators to safely access the bottled gases, generator, inverters without compromising the generators' fluid levels at the sloped angle.

DRIVING EFFICIENCY THROUGH INNOVATION AND INVESTMENT

Surerus Murphy's specialized tie-in welding rigs:

- reduces the welding time for a tie-in by up to 60%
- provides potential capabilities to achieve 3 tie-in welds/day on 48" diameter
- lowers costs by reducing crew sizes while improving efficiency, quality, and safety
- reduces welding repair rates to consistently <below 3%
- with the 6x6 wheeled rigs, mobilization/downtime between tie-in welds is negligible

Stories from the Field

MOBILE RIGS ENABLING SHELTERS ON TIE-INS ANSWER THE CALL FOR BETTER PREPARATION / SET-UP TIMES, WELD PROTECTION, BETTER WELD PERFORMANCE.

Witnessing how much time was spent setting up and breaking down equipment for tie-in welds, and to introduce semi-automatic/mechanized tie-in welding in challenging terrain, Surerus Murphy's engineering and welding teams identified the opportunity and value of building a customized, self-contained 100% low-hydrogen welding rig on ex-military six-wheel drive trucks.

The team designed an aluminum shelter to house all the necessary equipment, including the bugs, tools, wire feeders, lights, ventilation, and 14-service "umbilical" harness that is easily lifted off the truck's platform by its own picker crane, and dropped onto the weld in a bell hole tie-in location.

Once in place, the welding crew is working within 20 minutes in an enclosed environment sheltered from wind, precipitation, and other elements, ensuring a much higher weld quality. Worker safety is much improved as no one must carry equipment up and down ladders to reach the weld location in an excavation.

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RIG TRACKS MAKE SEMI-AUTOMATIC WELDING IN DIFFICULT, REMOTE TERRAIN POSSIBLE.

Surerus Murphy has designed a similar rig on track equipment to introduce semi-automatic welding in challenging rocky and mountainous terrain. The track rigs have self-leveling hydraulics that allow for steep slope work of up to 35°. The rig stays level, making for a safer environment for the operator, and allowing critical equipment (i.e. generators) to remain level to ensure continuous operation.

Each rig can perform a potential of up to three tie-in welds per day. With most of the operation being mechanized, this repeated performance can reduce the weld repair rate to less than .

Surerus Murphy has 22 wheeled units and 5 track units; the aluminum canopies that are 12-feet wide when in operation collapse to 8-feet wide when on the truck platform, enabling the trucks to be road legal for fast, unassisted transport to the next work location.

Surerus Murphy has established a successful track record relying on this equipment to perform semi-automatic tie-in welding on multiple projects, including Coastal GasLink, Trans Mountain Expansion, and TC Energy's North Montney Mainline and Karr Pipeline projects.



Tie-in rig (wheeled) perform below ground tie-in weld



Tie-in tracked rig (for steep slopes)

OUR WELDING INNOVATION AND TECHNOLOGY ENABLES US TO SERVE OUR CLIENTS WELL

Surerus Murphy's welding innovations are just one way the organization demonstrates its commitment to being the contractor of choice for its people and its clients by delivering safe and quality work. Surerus Murphy's shared values: "Never Harm, Trust, Integrity and Assured Delivery" make the organization a staple in the pipeline industry and in every community in which it works.

For more information email:

- **General:**
info@surerus-murphy.com
- **Media & Issues:**
marketingcommunications@surerus-murphy.com



www.surerus-murphy.com | 403.930.1358