CRC EVANS

Mechanized Welding Solutions for Final Assembly at Quay Side

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CRC EVANS

CRC Evans is a leading provider of welding and coating services for the evolving global energy and wider infrastructure sectors

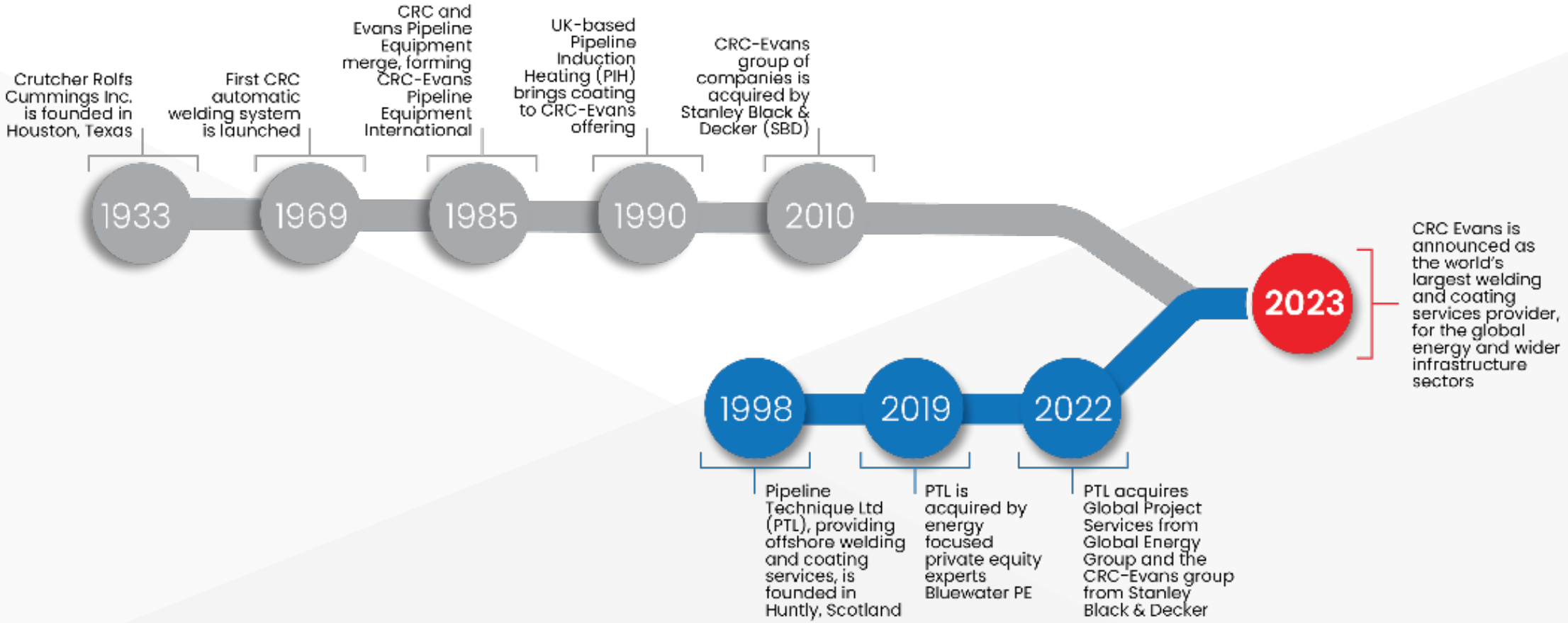
AGENDA

- CRC Evans Company Overview
- **Mechanised Welding in Pipeline Industry**
- Advantages of mechanised welding
- Vision of CRC Evans **for Final Assembly**
- OWGP (Offshore Wind Growth Partnership)
  Grant for improvement of mechanised welding for final assembly

CRC EVANS

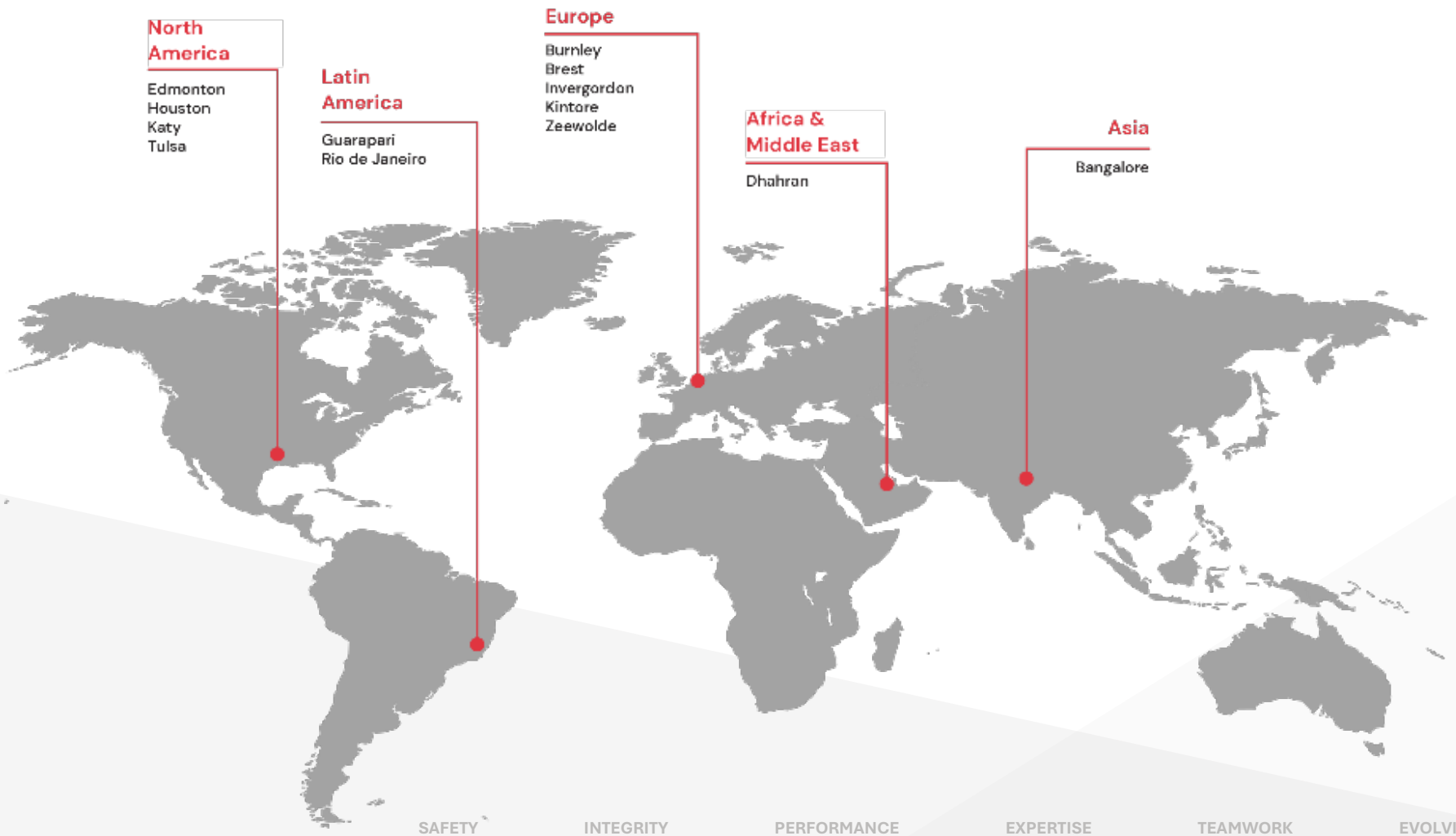
Our history

CRC Evans has a long history of providing high-performance services and solutions, with specialised welding and coating capability that has broad application across the evolving global energy and wider infrastructure sectors.



Global facilities

With welding and coating facilities and expertise in key global locations, CRC Evans can quickly mobilise to support our customers' projects anywhere in the world



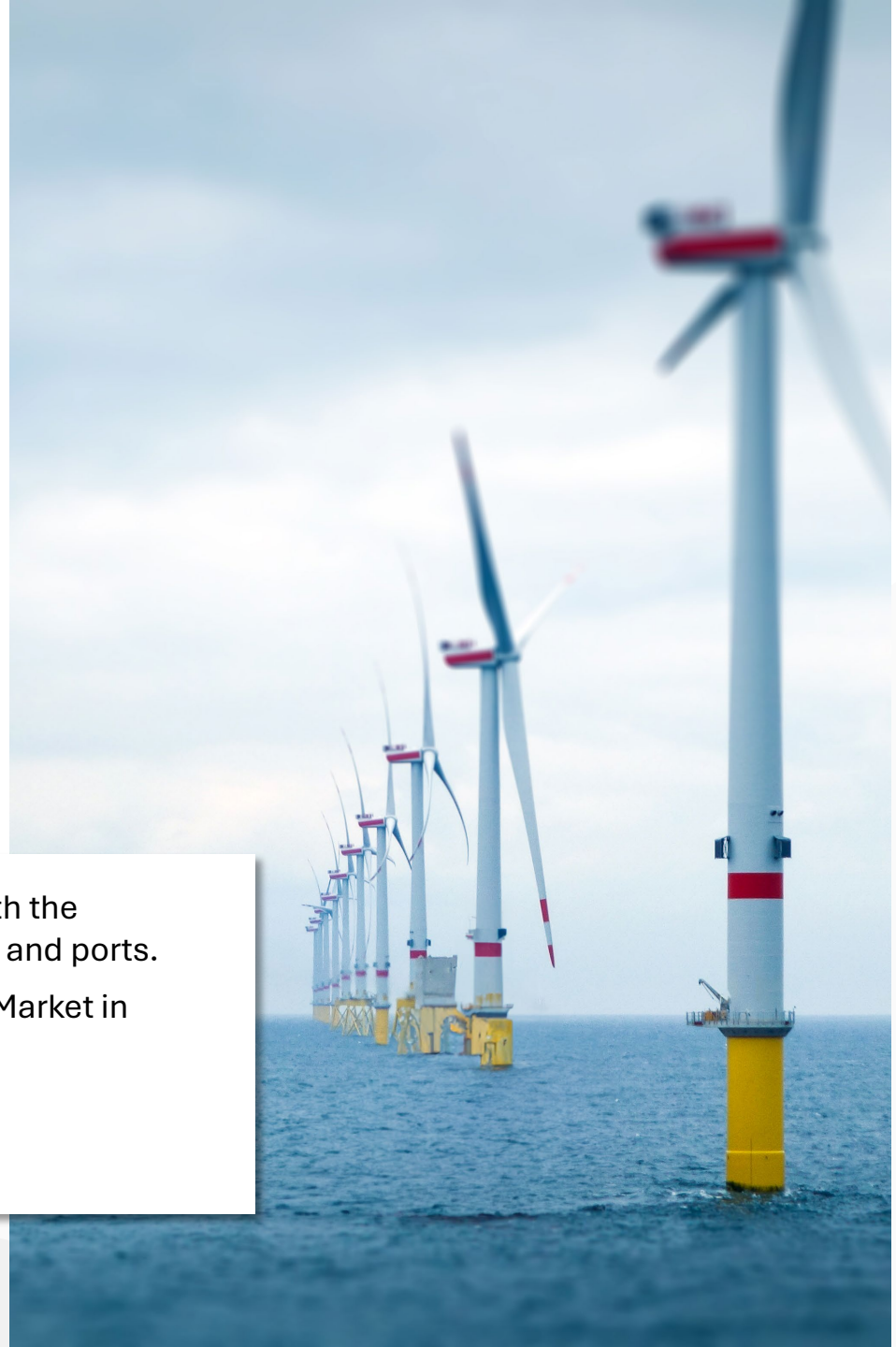
North America	
Edmonton	Project, welding, R&D, coating
Houston	Project, welding, R&D, coating
Katy	Project, welding, coating
Tulsa	Manufacturing
Latin America	
Guarapari	Fabrication, coating
Rio de Janeiro	Project
Europe	
Burnley	Project, R&D, coating
Brest	Project, fabrication
Invergordon	Welding, fabrication, project
Kintore	Project, fabrication, R&D
Zeewolde	Project, welding
Africa/Middle East	
Dhahran	Project, welding
Asia	
Bangalore	Engineering

CRC Evans vision in the floating wind market

CRC Evans' vision is to be the part of consortiums who will perform final assembly in the floating wind market in Scotland, the Celtic Sea and France – with an aspiration to be the definitive worldwide contractor for final assembly.

Our Services can be flexible depending of the size of the project and the final assembly site:

- Pre-feed analysis
- Welding services (Mechanised welding equipment – supervision and operators)
- Full assembly contractor with partners for cranes / spmt / scaffoldings / NDE



How can we achieve this?

- Training of welders (apprentice program)
- Propose our Mechanised welding solution on all the final assembly welds (including internal stiffeners if any)
- Continue our discussions with the majority of developers / EPCI and ports.
- Dedicated team for Floating Market in UK and France

Pipeline Welding - Onshore

CRC Evans have been in the business of Onshore Pipeline construction for 90+ years, delivering countless projects in diverse and challenging site conditions : from -30°C (Turkey / Siberia / Sakhalin) to 50°C (Middle East).

- Created the first automated welding machine in 1969
- Capability to weld pipelines 4 – 100” diameter
- Up to 100,000 welds per year
- Productivity of >100 welds a day on 36 / 42” pipe
- Majority carbon steel pipelines, with experience in Duplex and Cladded pipe

Pipeline Welding - Offshore

CRC Evans has vast experience in utilising mechanised welding machines for offshore pipeline projects worldwide. Utilising local welders, we ensure training and qualification is conducted over a period of days / weeks before project commences.

- 50 Year track record in offshore welding
- Up to 400 welds a day on small diameter pipelines
- **High Productivity**
  Good mechanised fit-up equipment work well with narrow bevel welding
- **Production never stops**
  24 hours a day, 7 days a week on production of long trucklines
- **Robust equipment**
  Easily replaced if needed, with a 5 minute downtime

Advantages of Mechanised Welding

- **Increased Productivity**
  Mechanised systems can operate faster and more continuously than manual welders. This leads to increased production rates and shorter project timelines. Possibility to work 24 Hours per day with minimal downtime.

- **Consistency and Quality**
  Mechanised welding systems provide consistent and repeatable welds, reducing the risk of human error. This leads to higher quality welds with fewer defects, reducing costly repairs interruptions and improve completion schedule.
  A Digital record of all parameters are logged for Quality Reports and Integrity Management.

- **Reduced Fatigue**
  Manual welding is physically demanding and lead to fatigue, which can affect the quality of work. Mechanized welding alleviates the physical strain on workers, leading to more consistent results over long periods

- **Better Control Over Welding Parameters**
  Mechanized systems offer precise control over welding parameters such as travel and wire speed, amperage, voltage, oscillation and arc stability, ensuring optimal conditions for each weld. In O&G for Steel Catenary Riser projects with high When Fatigue Requirement Mechanized Welding is Mandatory

- **Shorter Training Duration**
  Manual welding training is typically longer, requiring months to years due to the need for mastering various techniques and hand skills. Mechanised welding training is generally shorter, ranging from weeks to months, focusing on operating and maintaining automated equipment.

- **Reduced Labor Costs**
  Fewer skilled operators / welders are required on-site, and reduced training shall be performed.

M500 Single-Torch Welding System for Fabrication

CRC Evans' M500 single torch external welding system delivers exceptional arc visibility and high-speed travel, with intuitive single action installation.

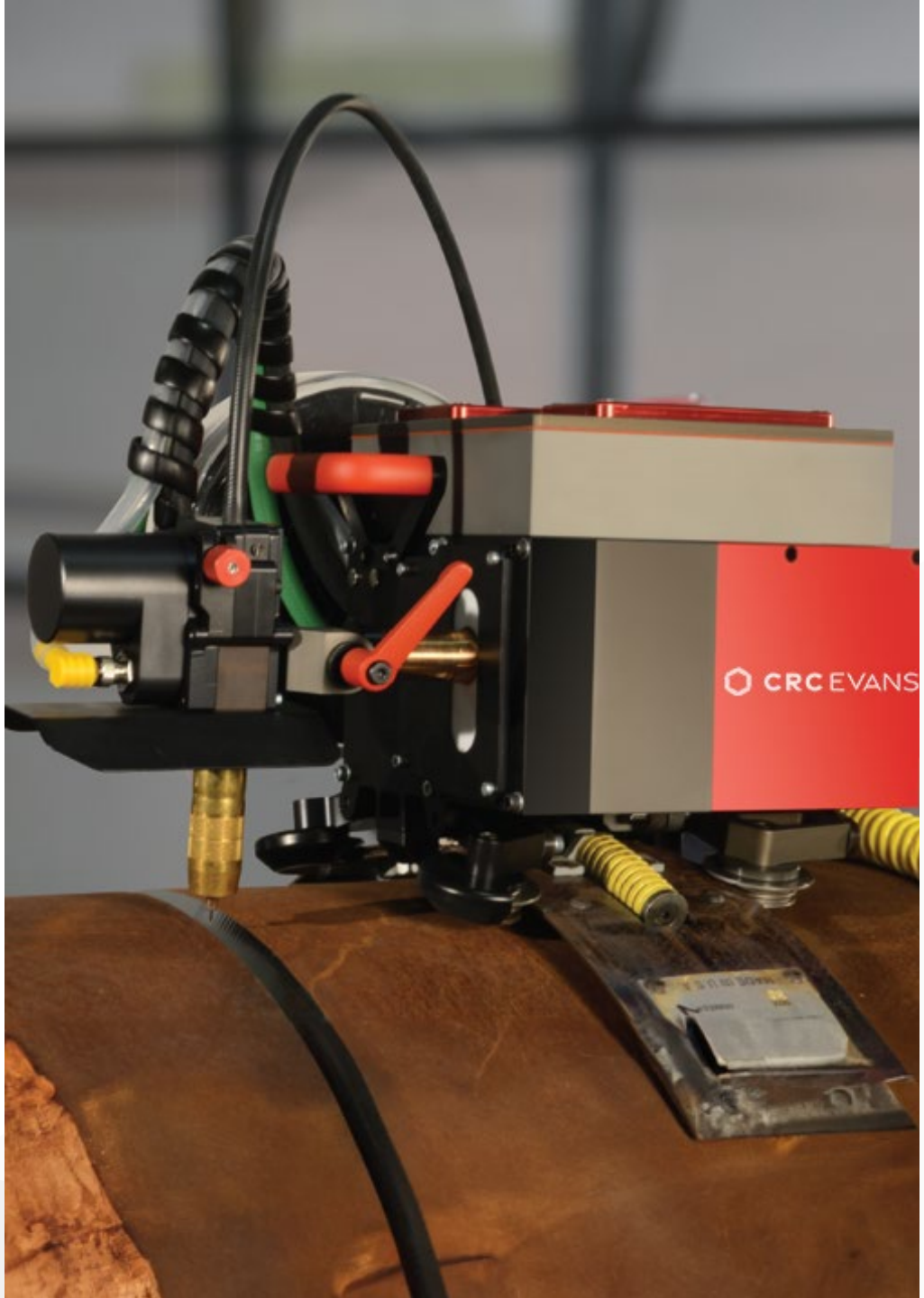
Onboard voltage, current sensing and adjustable head allows rapid head angle changes to provide reliable and consistent weld quality and high production rates.

Features:

- Data Logging for QC
- High-speed travel
- Long umbilical for fabrication weld
- Onboard voltage and current sensing
- Adjustable head for rapid angle changes
- All welding positions (uphill, overhead, flat, circular)

Benefits:

- Fewer welders
- Higher deposition
- Recording of parameters
- Higher productivity
- High level of consistency
- Easy and fast welder Training
- Lightweight for working at height



Welding Apprentices

With the current issue of a lack of welders in the workforce, CRC Evans is ensuring we pull through the next generation of talent, and they are trained to our standards.

By utilising our mechanized equipment, we can efficiently train a greater number of apprentices to meet industrial welding standards compared to manual methods.

- Apprentice Welders current total split between Invergordon and Kintore: 29
  - 1st Year – 9
  - 2nd Year – 10
  - 3rd Year – 10
- Range ages from 16 – 24
- 4-year structured apprenticeship supported by dedicated trainer
- Mix of school leavers, college educated, and partly qualified
- We attend local school career fares and recruit from the schools and colleges as well as recommendations from colleagues
- Current partners: Nigg Skills Academy, UHI, NESCol

Apprentice yearly plan

Regular interviews are held with apprentices' respective HR Advisor and Apprentice Trainer, ensuring they keep on track.

Years 1-2

Qualification

- SVQ Level 2 in Performing Engineering Operations & NC Level 5 in Fabrication and Welding

College timetable

- Kintore – day release and working in the workshop
- Invergordon – 16-week fast track course, then full time in the workshop

In-house training framework program

- Training compliments the formal education curriculum
- The program includes training/experience such as pipe facing, cutting, grinding and drilling
- Rotation between Kintore/Invergordon

Years 3-4

Qualification

- SVQ Level 3 Fabrication and Welding
- Full time workshop including on-site based assessments from the Colleges

In-house training framework program

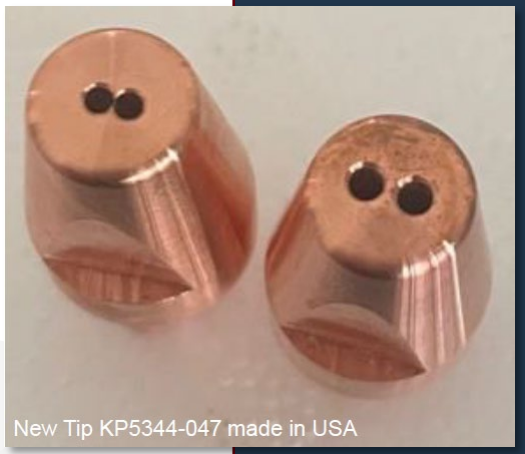
- Building on welding coding's
- Off-site work experience
- Any other relevant training required to build on skills and experience; abrasive, overhead crane, first aid wheels, forklift etc.

We aim to increase our team in UK from 250 welders to a minimum of 400 welders in 2030

CRC Evans selected for funding

CRC Evans recently received funding of up to £300,000 from Offshore Wind Growth Partnership (OWGP) to improve our mechanised welding equipment for final assembly welding.

- Currently have a mechanised welding solution (M500) for offshore floating wind structures (all diameters and wall thicknesses).
- CRC Evans were challenged by designers / developers to increase productivity with the current solution.
- Using the OWGP grant, we are integrating 2 welding wires in the same contact tips which will increase productivity.


New Tip KP5344-047 made in USA

M500 improvements for final assembly

CRC Evans Agreed with the Offshore Wind Growth Partnership that we were to hit 8 milestones during the development.

- **MS1** : Design integration and software Development in our R&D dpt in Houston
- **MS2** : Functionality Testing – Validation of development and transfer to UK
- **MS3** : Purchase welding bug / new power sources and associated equipment
- **MS4** : Fabrication of the units in Kintore - Scotland
- **MS5** : Preliminary Test for Semi-automatic welding
- **MS6** : Welding Validation for Flat Panel Design
- **MS7** : Welding Validation for Circular Design
- **MS8** : Project Report

Successful functionality tests in Houston during end of August :

- 15 minutes continuously welding with no issues
  (no instability / no damage on the contact tips)
- 5 meters umbilicals between the wire feeders and the welding torch with no issues
- Processes tested : GSFCAW and GMAW with solid wires with several synergies
- Weight of the welding machine is only 15 kg

Welding development for Flat Panel to start mid-November in Kintore

Conclusion

- **No Shortage of Welders for Future Fabrication**
  Mechanised welding alleviates the shortage of skilled welders by automating the welding process, ensuring consistent output without relying on a limited pool of manual welding professionals, and reducing the need for extensive training

- **Increased Productivity**
  Mechanised welding is faster than manual welding. Automated systems can operate continuously and at a higher speed without fatigue, which significantly boosts production rates

- **Overall Cost Reduction**
  Mechanised welding leads to a reduction in overall costs due to its increased efficiency, reduced labour requirements, and consistent quality, which minimize repairs

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