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Angus 3D Solutions' reverse engineering innovation accelerates Renewable Parts' circular economy role.

A partnership between a parts refurbishment specialist and a 3D printing expert is accelerating the circular economy in the wind power industry.

Renewable Parts is collaborating with Angus 3D Solutions (A3D) to find innovative solutions to remanufacture hydro mechanical, electrical and electronic components, which would otherwise go to landfill.

Nicole Ballantyne, Knowledge Transfer Manager for Digital Manufacturing at KTN, said: "With consumers holding their energy suppliers to account for green practices, the transition to a circular economy is inevitable."

"By sharing expertise, Renewable Parts and Angus 3D have fast-tracked innovation and developed a synergy which has boosted the opportunities for the circular economy."

"Joining communities together to drive positive change and transform UK manufacturing is exactly what we are looking to achieve with the Made Smarter Innovation Network over the next four years."

THE INSPIRATION

Renewable Parts, based in Lochgilphead, Scotland, is a supply chain and refurbishment specialist in the wind energy industry, restoring unserviceable parts to their original 'as new' condition.

The service offers customers quicker and more affordable access to used components in exchange for refurbishing parts for feed stock. In the last 10 years, it has refurbished parts for over 2,000 wind turbines, diverting over 100 tonnes of scrap from waste and landfill.

However, replacement components fluctuate in availability and price, requiring innovative ways of developing alternatives that can improve supply. This industry challenge has led Renewable Parts to explore new ways of engineering the parts and remanufacturing those that may have previously been scrapped.

Michael Forbes, General Manager of Refurbishment Engineering at Renewable Parts, said: "When a turbine is offline and losing revenue, we enable turbine owners to minimise that downtime and extract more value from their operations."

"With the costs of raw materials on the rise and a focus on more sustainable manufacturing methods, there is a shift by the wind power sector towards the circular economy to cut waste and carbon. The buy-new approach is becoming a thing of the past when we can use what we have and reap the benefits of recirculated parts, creating a more sustainable industry."

"Our advanced engineering techniques could only take us so far. We need to look at new technologies to continue our drive for continuous improvement. So we explored using 3D printing to overcome problems with parts which were beyond repair and couldn't be replaced very easily."

THE INNOVATION

Renewable Parts began collaborating with A3D, an expert in using 3D scanning technology to reverse engineer parts and 3D printing with

plastics and metal to manufacture broken or difficult to source parts, or patterns for casting.

For example, Renewable Parts struggled to source a replacement for a planetary carrier for a gearbox because of fluctuating availability and price.

A3D used a 3D scanner to capture the measurements and using software was able to create a digital version of the part. Engineers were able to perform detailed analysis of the asset to identify areas of wear and tear, which offered opportunities to improve the design and the performance.

Andy Simpson, managing Director of Angus 3D solutions said: "When we think of additive manufacturing (AM) we tend to think of concepts and prototypes, and how it is used in F1, aerospace and automotive design. We don't tend to think about how AM contributes to the end of life of the product or asset. Traditional industries rely on old assets and they need to extend that life. Reverse engineering parts and keeping it alive before it becomes scrap. If a business cannot replace it, it becomes a massive problem."

"3D printing is the answer to remanufacturing difficult components, extending the life of a component and increasing its functional performance."

"This could play a key role in enabling companies to reinstate existing old equipment, extend maintenance cycles and increase performance."



THE IMPACT

The success of the collaboration can be best illustrated with the production of gearbox components where intermittent supply of parts had impacted turbine availability. These advances have allowed Renewable Parts to improve lead-time, continuity of supply and cost, protecting turbine operations and reducing environmental impact. The parts' print pattern is now stored in a Renewable Part's digital warehouse to be manufactured whenever the opportunity arises.

The collaboration has also helped Renewable Parts develop in-house expertise and capacity, freeing Angus 3D to push the boundaries of engineering and technology to find solutions.

Michael, from Renewable Parts, explained "Having difficult-to-source

parts ready and waiting in our digital warehouse means we protect our supply chain, and we are ready to react to the market rapidly.

"We now also have a research and development department which means that we can do a lot of the ground work on a problem before engaging Angus 3D and providing them with better, cleaner data for them to apply their expertise to. This fast tracks solutions for us, our customers, and the industry."

"This continued innovation has led to us becoming a safety net for our customers, a last chance to see if something can be refurbished before it is condemned to scrap or landfill."

"We are on a journey to help the circular economy in the wind industry. Collaboration is crucial to its success."

