Our new Smart Tensioning System (STS) makes a complex process very easy to perform

Eliminate the risk, use smart bolting solutions

Calum Urquhart, Global Business Manager, Energy at Atlas Copco spoke enthusiastically to PES about smart bolting. For sure everyone has been hit by the pandemic but this innovative company, with a strong emphasis on R&D, supporting the customer and sustainability have found new ways of working, which will carry on after the pandemic.

PES: Hi Calum it's a pleasure to welcome you back to PES Wind. As always, we have many new readers, so it would be great if could you give us a brief history of Atlas Copco.

Calum Urquhart: Sure. Atlas Copco is a global, industrial company based in Stockholm, Sweden, with almost 40,000 employees and customers in more than 180 countries. We are pioneers and technology drivers, and industries all over the world rely on our expertise. Our market-leading compressors, vacuum solutions, generators, pumps, power tools and assembly systems can be found everywhere.

PES: Of course, we know you are a global, well established company, working in many sectors, but which do you feel are the most important and the ones you are currently developing?

CU: The energy sector is an area where have increased our focus significantly in recent years. Historically our focus was on manufacturing industries such as automotive, electronics and aerospace, where we provide assembly tooling, error proofing and quality assurance solutions for quality or safety critical applications on production lines within factories.

As the wind industry has developed in recent years we have also worked with major turbine and equipment OEMs within their facilities providing the same type of solutions. In recent years, as technology has developed in the turbines, we have seen an increased demand for quality control, and error proofing in the field, during the construction, commissioning, and maintenance of wind turbines.

This has led us to increase our strategic focus on the wind energy sector with an increased market presence globally, expanded product portfolio to include all bolting solutions used by the wind sector, and to invest heavily on innovative new solutions to meet the specific demands of the Wind industry.

PES: Could you tell us about the bolting technologies you use in the wind industry?

CU: As mentioned, we have been supplying electrically controlled tools to the wind OEMs in the factories for many years. Where typically you find electrically controlled nutrunners, with integrated transducers and intelligence to secure, the correct process is followed and the results can be logged and/or analysed for quality control purposes. This is commonplace on most factory floors today.

However, in the field it is rather different. Traditionally, tools such as hydraulic torque wrenches, and bolt tensioners have been used for many years, because they were specified in the initial process, despite the fact that the technology is very old. Today

Calum Urquhart

electric tools and battery tools are becoming more common as alternatives, due to their improved performance and flexibility, but overall, the tools used in the field are done so based on historic reference, or contractors' ageing tooling fleets.

In Atlas Copco we took the decision around 7 years ago to provide all the core bolting solutions used by the Wind Industry, as we wanted to become a strategic partner to our customers, and as such we felt it is critical to be able to offer the best product offer regardless of technology so that we could offer the best application advice to our customers, rather than promoting what we have.

This decision of course meant that we needed to invest more heavily in R&D, but that was a strategic decision we took. As a result, today we can offer a full range of both Industrial and Intelligent solutions for all product groups, i.e., hydraulic wrenches, bolt tensioners, electric and battery nutrunners,

We have a full range of industrial and intelligent bolting solutions, but the clear trend we see is the demand for smart solutions

With full inhouse design, engineering and manufacturing we have the ability to be agile and respond quickly to customers needs

even manual torque wrenches.

Additionally, with our inhouse engineering team, we have the capability to customise solutions for specific needs as required.

PES: We note that some of your latest solutions are enabling customers to work 3 or 4 times faster than using previous methods? This must be very well received?

CU: Yes, it is. We repeatedly hear from our customers that they want to make their bolting processes, 'quicker, safer and smarter', and so we use this as a guide for product development. An example of this is our Tensor Revo electric nutrunner system. This kind of tool has an integrated torque transducer and error proofing capability to ensure that the process is done correctly and that the specifications are achieved and logged.

However, the real competitive advantage of this product is that the tightening speed is more than 3 times faster than anything else on the market. If you can imagine tightening tower section bolts in a turbine where there are many bolts to be tightened and process time is critical, due to the expensive cost of cranes, and the limitations of weather windows.

The Tensor Revo tool can achieve such high performance due to 2 factors. First the high-performance motor technology we have developed inhouse, over many years and secondly how the speed is applied during tightening.

In other products on the market, tools may slow down as the load increases on a joint, or if the joint stiffness changes whereas in Tensor Revo the tool runs at the speed it is programmed for so there is no drop off in tightening speeds, resulting in a very high-speed tightening operation that is repeatable time after time.

What is really exciting about this product is that we are about to launch a new drive unit for the tool, which has been developed specifically for field use and will allow the tools to run even harder for longer, which is very important during the construction phase for example.

PES: Ae you able to tell us anything in regards to your customized wind energy tensioners and the potential benefits?

CU: In the wind sector, the turbine designs are changing, and evolving and there are also different turbines used in different locations so it's quite common for our customers to require a customized design i.e. something based on a standard product that exists today, but with some modifications.

At our Global Bolting Centre in UK, we have a dedicated engineering team that works on customized solutions. Having our own team for design and manufacturing means we can respond quickly and be agile in development, alongside our customers. This ensures that the customer gets a solution that is optimized for them, rather than compromising on a standard solution.

PES: What are the advantages of smart bolting to the end user, compared to the more traditional solutions and in terms of use, efficiency and cost?

CU: For us, when we talk about 'Smart Bolting', we mean the using bolting solutions that have sensors and intelligence built in that can enable a process to be completed in a quicker, or safer way, with less risk of errors. This also enables the possibility to record information on that process that can be used make improvements or track quality.

This is a huge change from traditional bolting solutions which for the most part have relied on either human judgement or skill of the operator to ensure that the results were achieved. Traditionally, to validate processes had been done correctly, this would involve, and still does in most cases, manual documentation procedures, where a technician physically records some data on paper, or perhaps today electronically, by inputting on a device such as a tablet.

By relying on people, the whole process becomes open to risk. Risk of mistake due to human error, to equipment malfunction, and also risk due to external demands, such as time pressure, extreme weather conditions. These may not be deliberate, but it is well known that even with the best trained people and the best intentions that mistakes can happen.

By using 'smart tools', this risk can be minimised and even eliminated. By taking many of the decisions away from the human, and enabling the tool to dictate what happens, you immediately increase consistency and predictability. Tools with sensors can monitor their performance and optimise their service life, therefore reducing operational costs. Tools that provide onscreen guidance are intuitive and reduce training demands, thus, reducing costs and maximising productivity.

Using integrated sensors to measure different parameters such as torque, load, angle, pressure, guides the operator to follow the correct process during bolting work, and so prevent mistakes from happening at the time of operation, or alternatively record when mistakes have happened and so reduce the need for further quality control checks, and even reduce service demands.

Furthermore, having full control of the bolting process through monitoring and control of the tools used, means that quality defects in other parts of the process can be detected. For example, if a bolt is defective due to inaccurate tolerances in the bolt design, a smart tool can detect this and highlight there is an issue at the time of application. This could

Major OEMs use smart tooling in their assembly lines today, with full error proofing and data capture

enable a quality defect to be identified at source, and before something fails in the future, potentially saving huge sums of money and reputation.

PES: Sustainability is high on your list of priorities for you as a company, how is this reflected in your products and work ethos?

CU: Sustainability is something that can be seen right across our business in the way we operate and in our products. We have a long history of working with our customers using our products to ensure good ergonomics and safe operations. We have also worked to increase our products' energy-efficiency, and quite recently started measuring their carbon footprints.

We have a group goal to reduce our products carbon dioxide emissions. We take good ethical behavior seriously, for example all employees and significant business partners sign-off compliance to our Code of Conduct yearly.

PES: Are you currently working on any new projects, or are there any future projects in the pipeline you can tell us about?

CU: Yes. Innovation is one our company core values, and we continue to invest for the future. Currently we are working on 2 very exciting new product launches this year.

The first, I mentioned earlier which is a new drive unit for our Tensor Revo electric nutrunners. The new unit is called PF XC and is optimised for field-based work. We have developed a new robust housing, which is easily transported to any location where bolting work has to be carried out.

We have also created a really simple HMI for programming the tool which requires no expertise and can be used with any mobile phone, in any location. This product will add increased uptime and ease of use to the already impressive tightening performance of the Tensor Revo tools.

The second product launch this year will be for our 'Smart Tensioning System' (STS) This is really exciting as it has been created by using the experience and technology we developed over many years in manufacturing, and applying this to the bolt tensioning process.

We have developed a highly innovative solution for controlling the tensioning process by guiding the operator, and recording data in a really simple and intuitive package. Effectively making a complex process really simple.

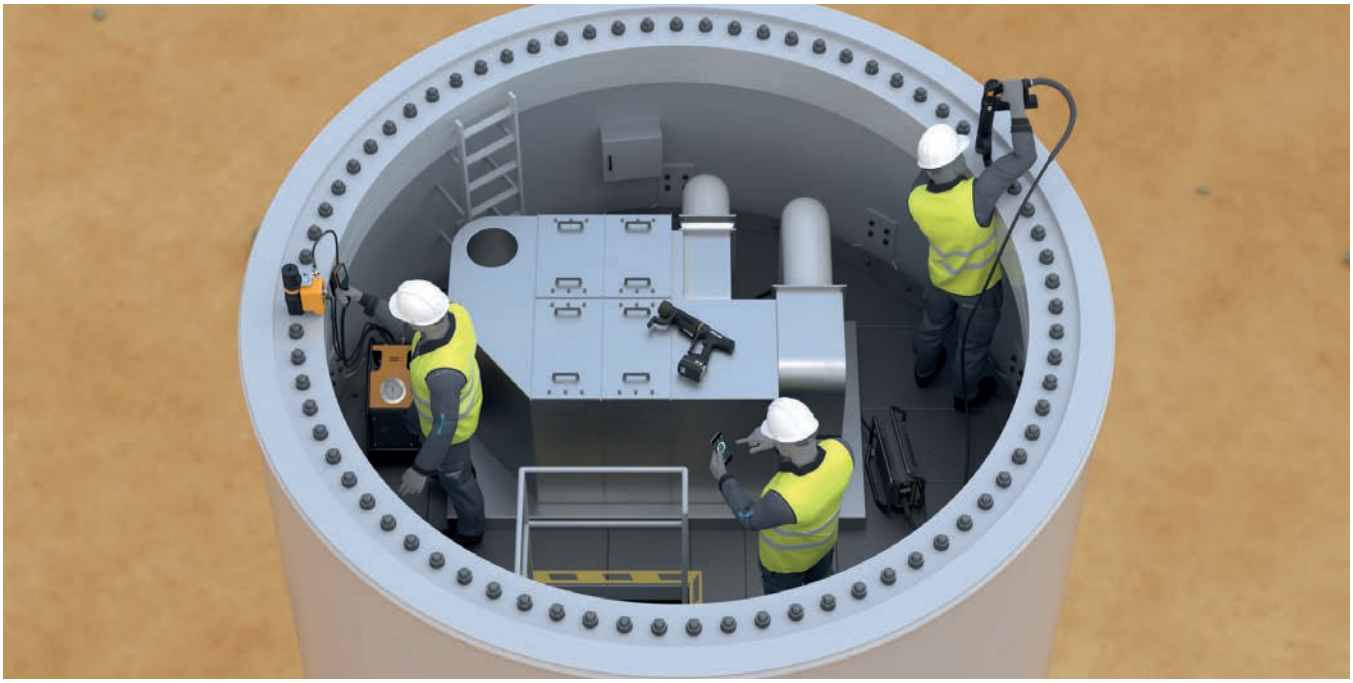
As turbines get larger, and the designs are optimised even more, there is an increase in demand for bolt tensioning in the wind sector. This runs parallel to an increased requirement for more process control and data collection. We are really looking forward to launching this product as we believe it will really transform the market.

PES: Why do you think clients should choose your solutions, what added value do you offer?

CU: As mentioned already, there are many technology benefits when using our solutions and no two customers are the same. All bolting equipment users have their own pain points and their own business drivers. The key for us is to work closely with our customers to solve their individual needs.

We aim to deliver superior productivity and

Our recently launched smart high torque battery tool can significantly reduce process times for service operations



We see a future where all bolting technologies can have one user experience: taking the smart factory to the field

the lowest cost of ownership, because this translates into real business results for our customers. We are a provider of premium products and services and so our customers expect a strong return on their investment and we feel that we have proven this over many years, which is why we are partners with the leaders in the many industries we are present in.

PES: It would be interesting to know where your main wind industry clients are based, are they mainly offshore, onshore or both and if this has changed over the years?

CU: It is still the case for us today that the majority of our business is in the onshore sector, with major markets for us for example in USA, which is still dominated by onshore wind for the time being.

However, in recent years as offshore has grown, our business has also evolved and today we supply a lot of tooling for offshore wind turbine manufacturing in both Europe and in China. This is really interesting as the offshore turbines are getting bigger and more complex, and so the needs are changing. We see this as an opportunity for new technology to be implemented so it's an exciting time.

PES: Are there are any other markets you would like to break into?

CU: We are a truly global company, with customers in 180 countries around the world so we are already present in most locations. However, our main focus right now is to increase our presence in the field-based operations of the wind industry, i.e. construction, commission and maintenance, wherever they may be. Our mission is to 'bring the smart factory to the field' and with our global footprint we feel we can be a strong partner for wind OEMs to make that happen.

PES: COVID-19 made 2020 a difficult year for many companies, what impact did it have on you, as a company and do you see that changing as we move forward in 2021?

CU: Like all companies we have had to adapt. We have made changes in how we conduct our business and how we interact with customers, but what was most impressive was the way we adapted and so quickly. We kept a high level of customer engagement with digital tools and found new ways to interact, which will remain with us as we go forward.

We also realised that as the recovery period will take a long time, stable and strong suppliers will be critical for all companies. With this in mind, we have continued to invest in R&D, as we believe that innovation drives growth. We want to be ready to bring new products to the market to help our customers, as they recover from Covid19.

PES: Where do you see Atlas Copco in particular and the offshore wind industry in general, in 5 years' time?

CU: The offshore wind industry will continue to grow and to expand its footprint globally with North America coming onstream to follow Europe and China and it will become a truly global industry. As the turbines get bigger, the geographic spread gets wider, and the technology and quality demands increase.

Our vision is to be at the forefront of the industry, as a technology leader in the field of bolting and in particular smart bolting. We will help our customers and the industry to produce renewable energy in the most efficient and cost-effective way by maximising process security, minimising human and operational risk and reducing their total costs.

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Revo with PFXC is 3 times faster than any other product in the market