



Designing and manufacturing a completely new GTP-type generator rotor

One of Suzano's spare generator rotors was badly damaged during balancing. Thanks to the engineering expertise accumulated working with similar equipment, Fortum eNext was able to manufacture a completely new rotor based on the original design, but enhanced with upgrades and modern material.

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At over 90 years old, Suzano S/A (old ‘Suzano Pulp and Paper’) is a Brazilian pulp and paper company with a presence in more than 80 countries. It is the largest pulp and paper company in Latin America and one of the largest producers of eucalyptus paper in the world. Its product portfolio includes coated and uncoated printing and writing paper, paperboard, tissue paper, market pulp, and fluff pulp.

Suzano contacted Fortum eNext in early 2017 for support because one of their spare rotors had been damaged in the balancing pit after a rewind performed by another company. As the rotor could not be repaired, the customer wanted to know whether it would be possible for Fortum to manufacture a similar type of ASEA-GTP rotor from scratch. The challenge was that ASEA had delivered the last rotor in the 1970s and nobody had manufactured a rotor like this in almost 40 years. Also, the OEM had told the customer that it could not be done.

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This type of rotor has not been manufactured in nearly 40 years.

The rotor in question is of a unique design that Fortum eNext knows very well. These ASEA GTP-type rotors – later ABB – were originally manufactured in a workshop in Västerås, Sweden, where Fortum eNext today runs a dedicated workshop for generator maintenance services. Approximately 2000 ASEA/ABB GTP-type generators were manufactured there between 1920–1988; about 500 are still in operation and, as with Suzano, crucial for industrial processes.

Having maintained the engineering know-how of the technology and how these rotors are designed and how they should be rewound



and high-speed balanced, Fortum eNext was able to offer the delivery of a completely new rotor based on the old design of the one that failed, but enhanced with upgrades and modern material.

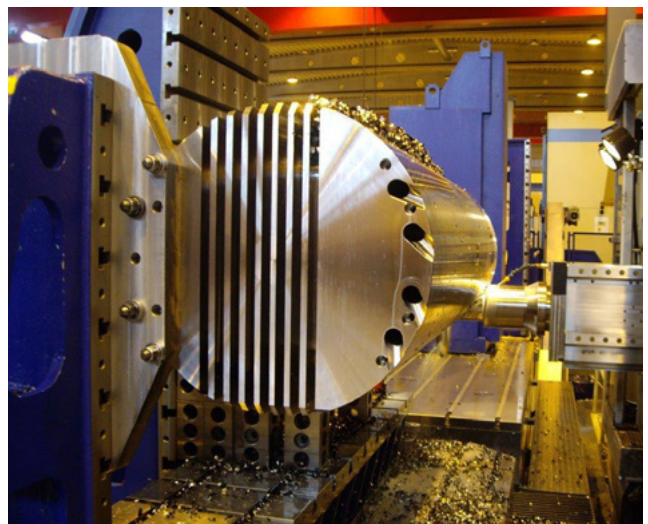


The technical lifetime of a generator is around 30 years, but in fact they can run much longer than that. Ways to prolong the lifetime are, like in this case, manufacturing new components or e.g. by rewinds.

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In September 2017 Suzano sent two engineers to Sweden to visit Fortum's generator workshop and engineering office in Västerås as well as a customer in Stockholm for whom Fortum had rewound two similar rotors six years earlier.

"After the visit to the workshop and balancing facilities in Västerås, we were convinced that Fortum would be the one who could build a new rotor for us. The other customer in Stockholm also





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highly recommended Fortum for their commitment and support,” says **Alessandro Moscardini de Moraes** from Suzano’s Corporate Engineering Department.

Finally, in 2019, almost two years after the initial contact, the much awaited order came in. The order was divided in two parts. First, Fortum was to manufacture a completely new rotor and, then, after a successful delivery, Suzano would send another rotor for a rewind.

Seamless cooperation and the involvement of many experts are the prerequisites of success in a complex project like this. Capturing the know-how and the know-why from experienced personnel and transforming that into how a rotor like this should be built today, with modern production equipment, Fortum’s engineering department made the design of the new rotor. The difficult machining of the rotor parts was done by a skilful sub-supplier in Finland and the building of the rotor by Fortum’s own workshop experts in Sweden.



Fortum eNext is one of the very few service providers able to also offer stator rewinds for this type of generator.

As a final quality test, the new rotor was run in the high-speed balancing pit adjoining the workshop, where it was balanced at 3600 rpm and overspeed tested at 4320 rpm. This was the part that, for obvious reasons, worried the customer the most, but the rotor ran very smoothly, and, ultimately, all electrical tests – stand still and 3600 rpm – were passed.

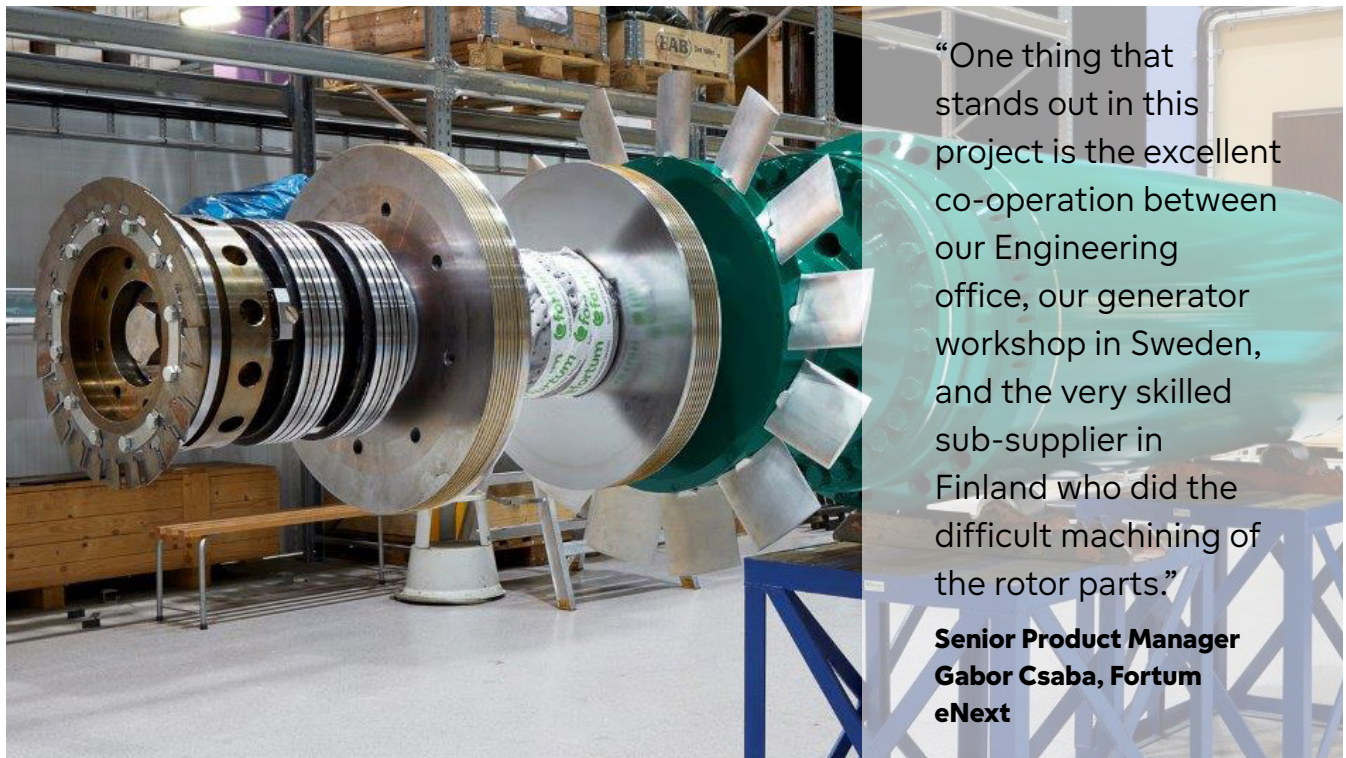
“I was impressed with how the know-how of designing and high-speed balancing of these rotors has been maintained within Fortum. It’s not easy to find a service provider in Brazil with the equipment, the facilities, and especially a big enough balancing pit like the one in Västerås to overhaul a generator like this,” Mr Moscardini de Moraes adds.

With some reorganisations due to Covid-19 pandemic the work took a little longer than planned, but the rotor was nevertheless sent to Brazil in time for the next planned outage. In the meantime, Suzano sent another rotor to Sweden for rewind, as initially ordered.

“I really came to appreciate the openness in our cooperation. In projects like this there are always some problems along the way, but with Fortum they were brought to our knowledge, they were looked into, and eventually solved together. That’s how things need to be managed,” comments **Sérgio Vinícius Puga** from Suzano’s Engineering and Projects Department.

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Alessandro Moscardini de Moraes, Corporate Engineering Department at Suzano



“One thing that stands out in this project is the excellent co-operation between our Engineering office, our generator workshop in Sweden, and the very skilled sub-supplier in Finland who did the difficult machining of the rotor parts.”

**Senior Product Manager
Gabor Csaba, Fortum
eNext**

Customer

Suzano S/A, Brazil – pulp and paper company

- Plant type: Paper mill
- Type: ASEA GTP 1050CZ
- Commissioned: 1972
- Power: 2 x 15 MVA, cosphi 0.85, 3600 rpm
- Generator and turbine: Radial steam turbine
- Running season: Continuous

Customer needs and challenges

- » One of customer's spare generator rotors was badly damaged during balancing; the rotor could not be repaired
- » Nobody had manufactured a rotor like this in almost 40 years; also, the OEM had told the customer that it could not be done
- » Finding a specialized partner to manufacture a similar type of ASEA-GTP rotor from scratch

Solution by Fortum eNext

- » Having maintained the engineering know-how of the technology and how these rotors are designed and how they should be rewound and high-speed balanced, enabling the delivery of a completely new rotor.
- » Create seamless cooperation between in-house experts and skilful sub-suppliers to design and build the new rotor with modern production equipment.

Customer benefits

- » Obtaining a completely new rotor based on the original design, but enhanced with upgrades and modern material
- » Clear savings, thanks to prolonged equipment lifetime
- » Establishing contact with a service provider with the engineering know-how, the equipment, and the facilities for overhauling generators of different types and sizes



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