Study Committee A1

ROTATING ELECTRICAL MACHINES

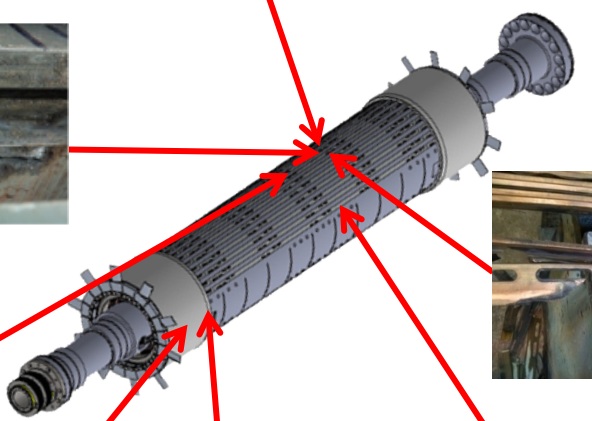
Paper ID-1021

TITLE

Damaged generator rotors: the economic and logistical benefits of repair over scrappage

Generator motoring

- Motoring incident at standstill
- Subsequent arcing
- Rotor double earth fault



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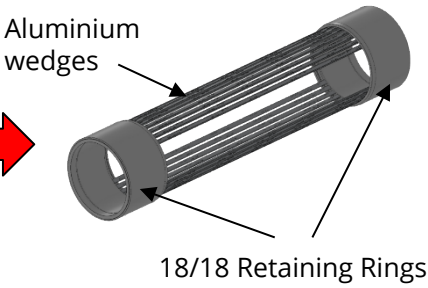
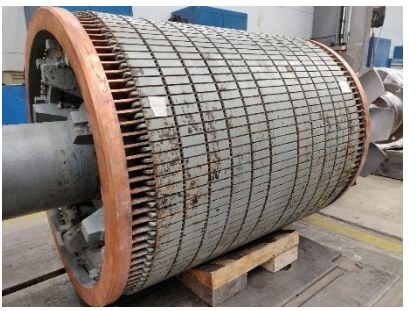
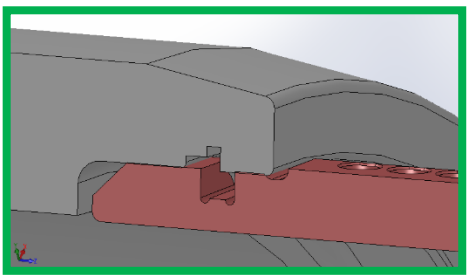
Rotor fully

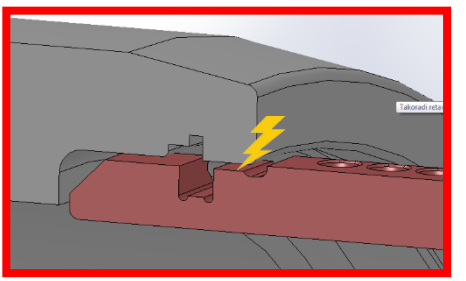
Rotor damper cage





Rotor at speed	Rotor standstill
▪ Centrifugal force	▪ NO centrifugal force
▪ Good linkage between retaining rings and wedges	▪ NO linkage between retaining rings and wedges
▪ Low resistance joint	▪ HIGH resistance joint





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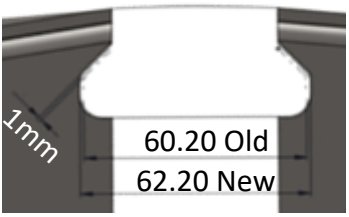
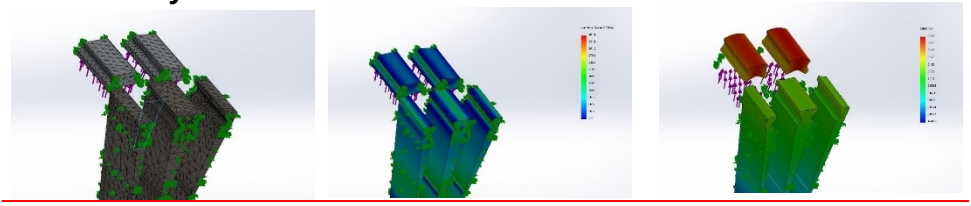
Forging repair

New slot profile

- FEA model
- Stress analysis (Von Mises) for both profiles
- 3 different mesh sizes applied
- 120% rated speed
- Comparsion between both profiles



Stress analysis



Results

FEA profile	Mesh size	Von Mises stress (MPa)	Deflection (mm)
Original	8mm	516	0.331
	5mm	**516**	0.331
	2mm	548	0.331
New	8mm	533	0.318
	5mm	**565**	0.318
	2mm	564	0.310
New profile, With wedge surface contact	8mm	281	0.230
	5mm	361	0.236
	2mm	339	0.233

The Von Mises stress between the two profiles changes by only **8.7%**