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## APPENDIX A

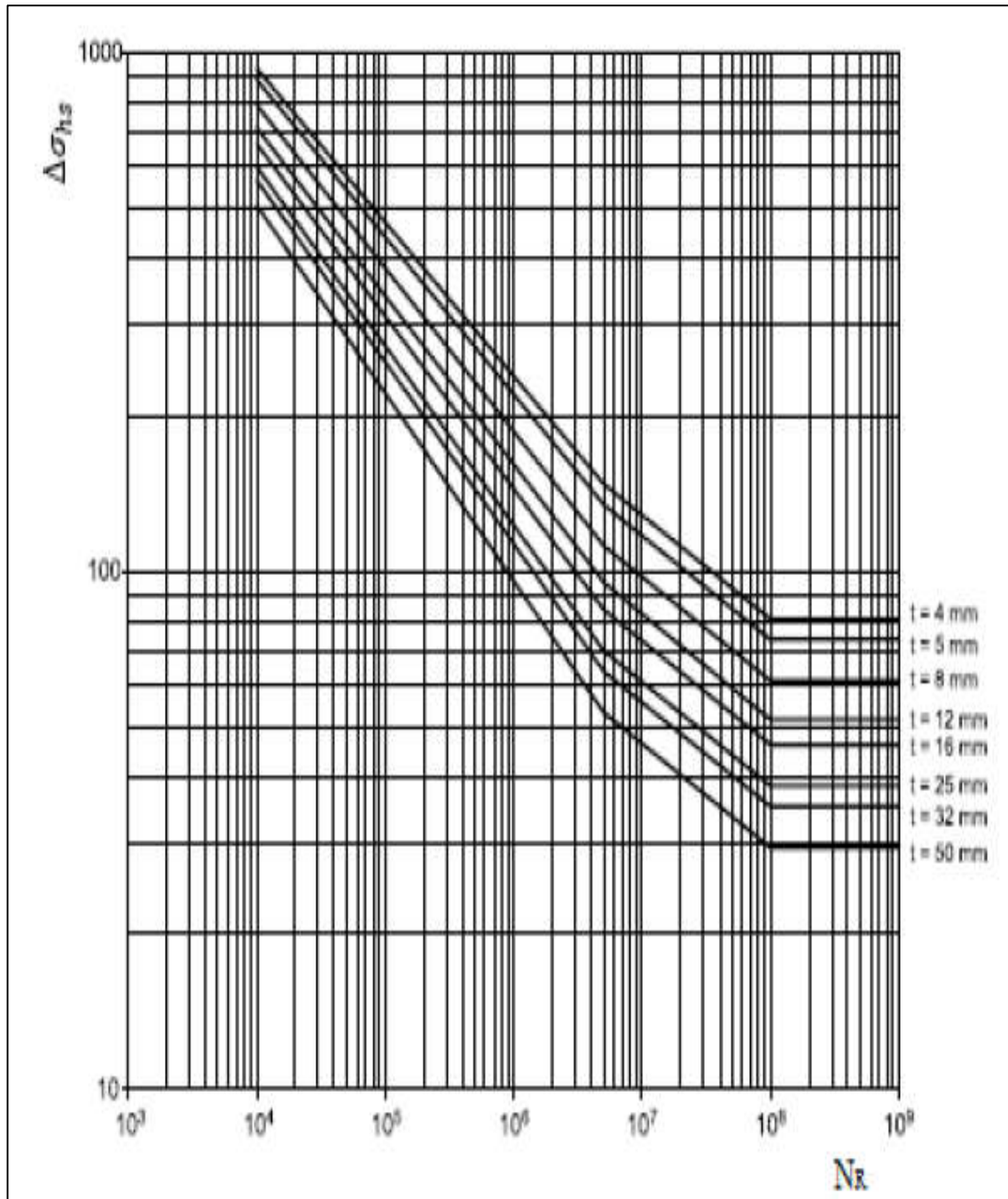


Figure A.1 S-N curves for RHS and CHS joints in lattice structures – hot-spot stress method

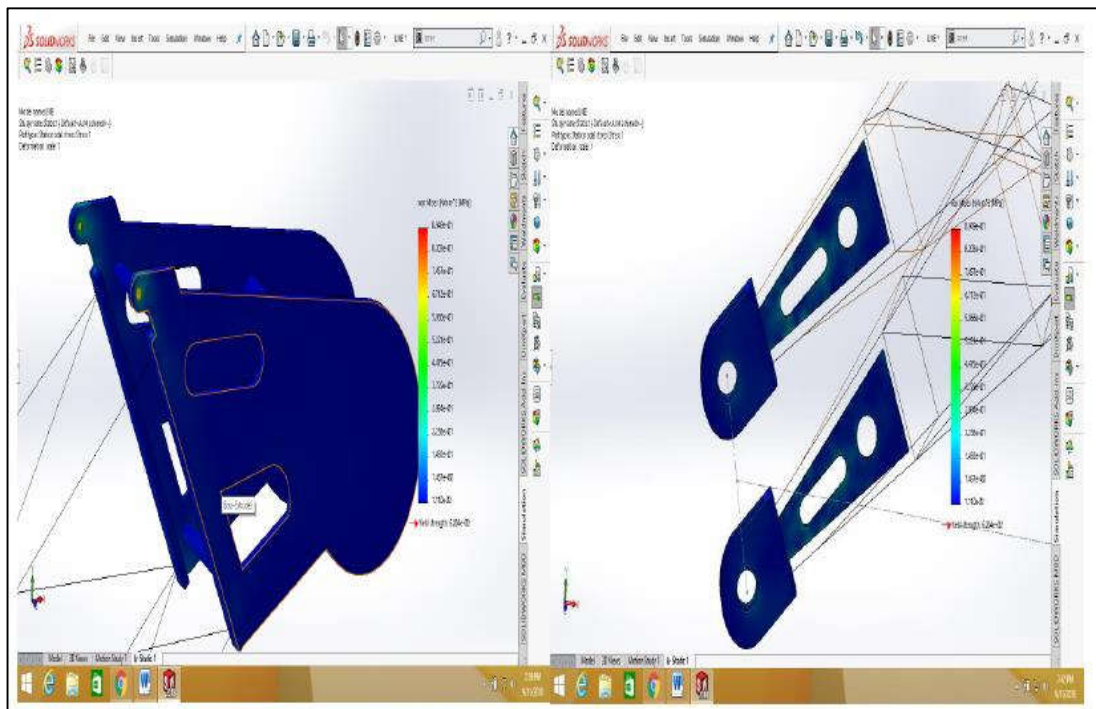


Figure A.2 Stresses on boom head and boom foot weldment under self-weight condition

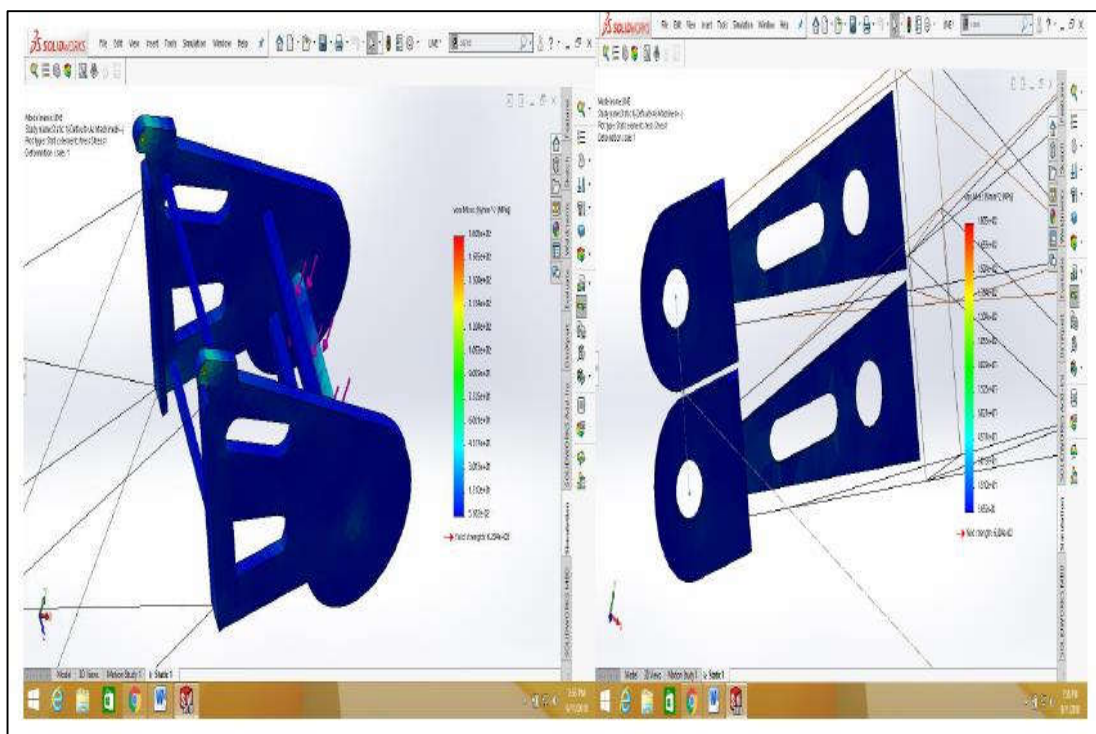


Figure A.3 Stresses on boom head and boom foot weldment under maximum loading condition

Table A.1 Minimum breaking strength of the mining wire ropes for 6-Strand PFV strength and weight (Mining surface broacher)

Diameter (mm)	Weight (kg/m)	Minimum Breaking Force (kN)
44.5	8.5	1361
47.6	9.7	1548
50.8	11.0	1762
54.0	12.5	1966
57.2	14.0	2198
60.3	16.0	2438
63.5	17.7	2687
66.7	19.5	2945
69.9	21.4	3212
73.0	23.4	3488
76.2	25.5	3781
79.4	27.6	4075
82.6	29.9	4377
85.7	31.3	4706
88.9	34.6	5018
92.1	37.2	5356
95.3	39.8	5703
98.4	42.5	6050
101.6	45.3	6406
104.8	47.8	6735
108.0	50.4	7109
111.1	53.7	7509
114.3	57.0	7918
117.5	60.0	8310
120.7	63.2	8701
123.8	66.5	9119
127.0	69.9	9528

Table A. 2 Failure mode and their respective type of repair in a dragline (Minerals, 2016)

Unit	Code	Component	Failure Mode	Repair Type
<b>Rigging</b>	RI1	Socket	Breakage	Welding
	RI2	Ringbolt	Breakage	Welding
	RI3	Rope-Mode01	Rupture	Replacement
	RI4	Rope-Mode02	Dislocation from pulley	Recovering the mechanism
	RI5	Pulley-Mode01	Irrecoverable malfunction	Replacement
	RI6	Pulley-Mode02	Mechanical disintegration	Recovering the mechanism
<b>Machinery House</b>	MH1	Generators	General malfunction	Removal of brush dust, fixing armatures, bearings or couplings
	MH2	Motors	General malfunction	Removal of brush dust, fixing armatures, bearings or couplings
	MH3	Lubrication	General malfunction	Fixing injectors, valves, pumps, air compressors or timing mechanism
	MH4	Air conditioning	General malfunction	General repair
<b>Movement</b>	MO1	Rotation	General malfunction	Fixing transmission box, bearings, felts, pinion gears, turret traversing mechanism, rails or flanges
	MO2	Walking	General malfunction	Fixing transmission box, bearings, felts, walking axle, journal bearing, pins or steel construction of walking feet
	MO3	Warning	General malfunction	Fixing connection couplings or warning brushes
<b>Boom</b>	BO1	Boom chords	Fracture	Preventive welding

**LIST OF PUBLICATION**

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- ❖ Shukla Asit and Rai Piyush (2019), Modeling of Dragline Boom Structure, Journal of Mines, Metals & Fuels Vol. 67, No. 9, pp. 431.
- ❖ Shukla Asit and Rai Piyush (2020), Finite Element based modeling and analysis of dragline boom structure, Journal of Mines, Metals & Fuels Vol. 68, No. 2, pp. 50-56.