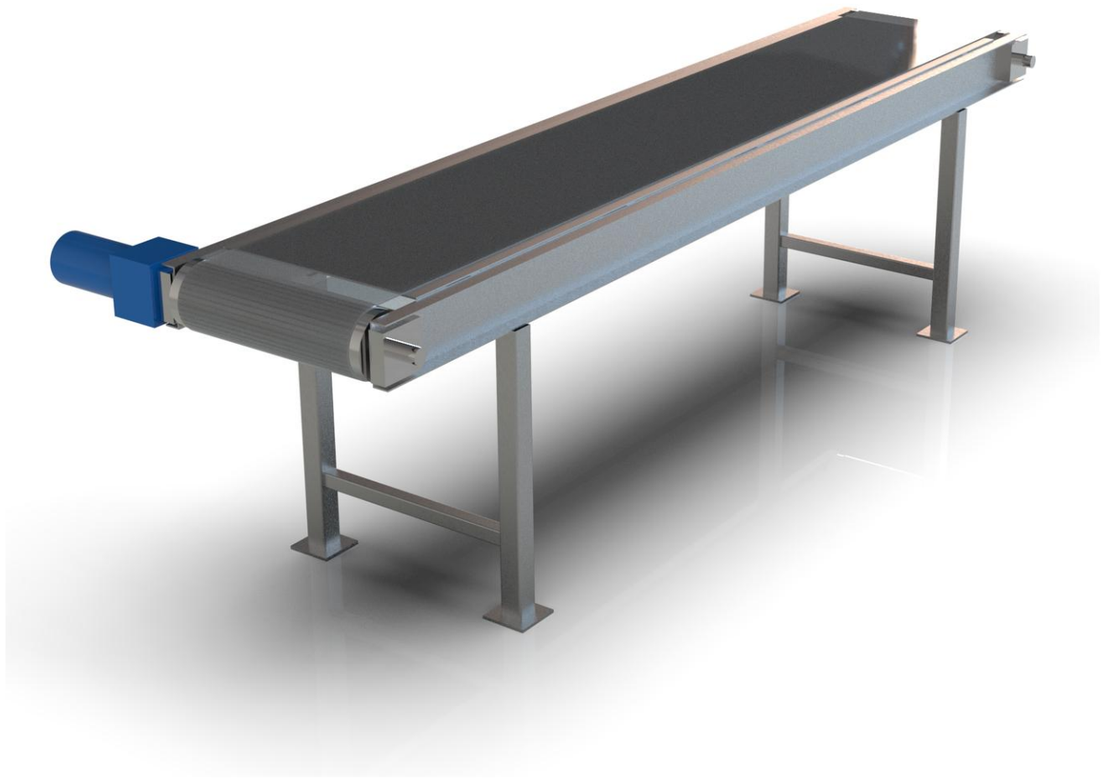
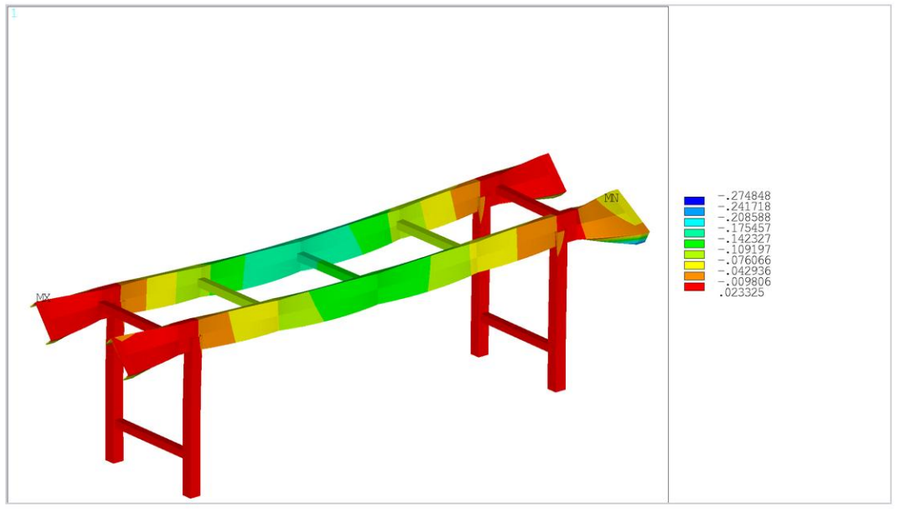
Belt conveyor, 3 m x 500 mm, slider bed

Concept design · parametric 3D CAD · drive sizing in MATLAB · frame analysis



Design data

Conveying length	3,000 mm between drum axes
Belt	PU, 500 x 3 mm, endless
Transport height	898 mm
Drums	D160 x 560, shaft D40
Frame	folded channels 150 x 40 x 4
	slider bed 5 mm, AISI 304
Legs	SHS 60 x 60 x 3, two stands
Drive	shaft-mounted gearmotor 0.25 kW
Overall size	3166 x 1070 x 898 mm
Parts	11 part numbers, 3 sub-assemblies



Drive sizing (MATLAB)

Design load	50 kg/m, 150 kg on the belt
Belt speed	0.30 m/s (36 rpm)
Peripheral force	456 N
Drum torque	36.5 Nm
Required power	171 W
Belt tensions	835 N / 379 N
Drive shaft D40	6.7 MPa equivalent
Fatigue margin	24

Frame analysis (FEA)

Model	beam elements, 778
Total mass carried	377 kg
Max. deflection	0.16 mm
Side beams	6.0 MPa
Legs	5.9 MPa
First natural frequency	10.9 Hz
Hand check, beam stress	5.6 MPa
Hand check, deflection	0.18 mm