

## INTISARI

Sistem otomasi cenderung lebih efisien, lebih akurat, error rendah, produktivitas tinggi dan tenaga kerja lebih sedikit. Dirancang alat diharapkan membantu proses pencampuran, pemindahan reagen yang memerlukan ketelitian dan mengurangi resiko akibat tumpahnya larutan/reagen suatu bahan kimia yang berdampak buruk bagi kesehatan makhluk hidup, dan lingkungan.

Spesifikasi konveyor jenis beban satuan (*unit load*), konstruksi arah pemindahan beban pengangkutnya secara horizontal, material pada poros JIS G 4501 S30C dan material struktur kerangka akrilik (*PMMA Plastic*) ketebalan 5 mm. Mekanisme perancangan terdiri: pengumpulan studi literatur, menentukan kapasitas konveyor, menghitung putaran poros penggerak, merencanakan momen puntiran, menentukan jenis bahan, jenis poros, faktor keamanan, menghitung tegangan geser yang diizinkan, merencanakan diameter poros, menganalisis kekuatan poros sesuai ASME, menentukan kapasitas maksimal, dan simulasi dari uji struktur kerangka menggunakan *Autodesk Inventor 2016*.

Hasil dari perancangan alat konveyor pengisi bejana untuk penelitian di laboratorium dijelaskan dalam gambar 3 dimensi berbentuk *assembly* dan *part* dengan dimensi Panjang 570 mm, lebar 400 mm dan tinggi 400 mm, kapasitas konveyor sebesar 0.00279 ton/jam, sehingga didapatkan daya konsumsi yang dibutuhkan 2.79 Watt, motor listrik pemindahan daya dan rpm menggunakan roda gigi cacing (*worm gear*) dengan putaran penggerak 35 rpm, analisis kekuatan poros tegangan geser yang timbul 4.35 kg/mm<sup>2</sup> lebih kecil dibandingkan dengan tegangan geser yg diizinkan sebesar 6.15 kg/mm<sup>2</sup> disimpulkan poros dalam keadaan layak dan aman dengan diameter poros 8.584 mm dengan jenis bahan JIS G 4501 (S30C). Analisis kekuatan struktur menggunakan *stress analysis autodask inventor 2016* didapatkan hasil tegangan maksimum 70.63 Mpa, *Displacemen* maksimum 0.93 mm dan faktor keamanan minimum 2.38 ul. disimpulkan konstruksi layak dan aman bebanan maksimal diasumsikan 10 kg.

**Kata kunci:** *conveyor melingkar, pesawat angkat angkut, sensor proximity capasitif, Stress analysis Autodask Inventor 2016, sensor flowmeter.*

## ABSTRACT

Automation systems tend to be more efficient, more accurate, low errors, high productivity and less labor. The design of the tool is expected to help the mixing process, regen transfer which requires precision and reduces the risk of spilling solution regen a chemical that has a negative impact on the health of living things, and the environment.

Unit load type conveyor specification, horizontal transport load direction construction, material on JIS G 4501 S30C shaft and acrylic (PMMA Plastic) skeleton structure material thickness of 5 mm. The design mechanism includes: collecting literature studies, determining conveyor capacity, calculating of the drive shaft rotation, planning of twisting moments, determining type of shaft, safety factor, calculating permissible shear stress, planning shaft diameter, analyzing shaft strength according to ASME, determining maximum capacity , and framework of the structure test simulation using Autodesk Inventor 2016.

The results of designing a conveyor of vessel filler for research in a laboratory explened in the drawing of 3-dimensional in the form of assembly and parts, with dimensions of Length 570 mm, width of 400 mm and height of 400 mm, conveyor capacity of 0.00279 tons / hour, so that the required consumption power is 2.79 Watts, power transfer electric motors and rpm use worm gears with 35 rpm, analysis of shaft shear stresses arising 4.35 kg / mm<sup>2</sup> smaller than the permissible shear stress of 6.15 kg / mm<sup>2</sup>, the shaft is concluded in a state feasible and safe with a shaft diameter of 8,584 mm with a type of material JIS G 4501 (S30C). Analysis of structural tension using “stress analysis autodesk inventor 2016”, so the maximum shear stresses is 70.63 Mpa, maximum displacement is 0.93 mm and minimum sefety fector is 2.38 ul. It is concluded that construction is feasible and safe with a maximum cost of 10 kg.

**Keywords: circular conveyor, transport lift, proximity capasitive sensor, Stress analysis Autodask Inventor 2016, flowmeter sensor.**