

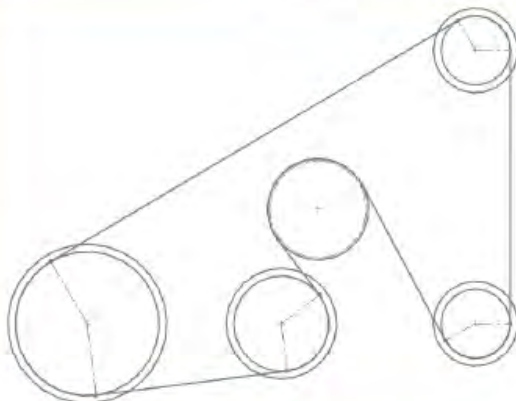
Abstract

The objective of this project is to design an inverted vacuum conveyor that can receive product in bulk and evenly space the product along the conveyor.

Design objectives

- Machine must receive 300 products/min.
- 3-4 inch even spacing
- Suspend product during operation
- cannot damage product
- Compact and adaptable.

Timing Belt

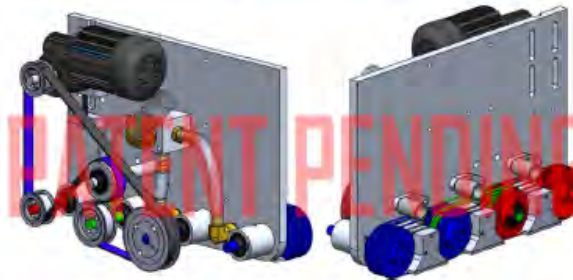


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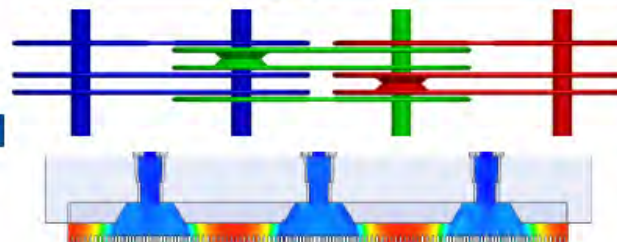
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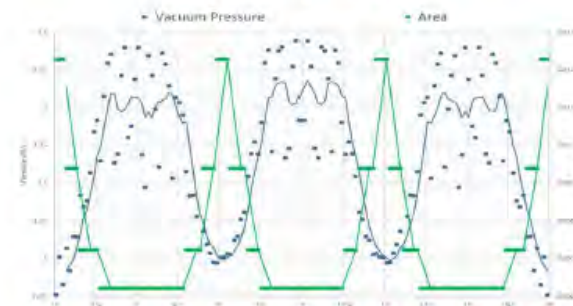
Assembly



Design Challenge



$$F = P * A$$



Discussion

We used flow simulations to determine areas of weak vacuum pressure then designed the face of the vacuum chamber so that areas with weak vacuum were given a large area while areas with strong vacuum were constricted. This worked to achieve even upward force capable of holding up the product along the entire conveyor.

The conveyor pulleys were designed to overlap such that product exchanges seamlessly from one speed conveyor to the next. To achieve a smooth transition half of the pulleys on the middle shafts are fixed to their shaft while the other spin freely



Conclusion

Over the course of this project, we learned a great deal about communicating with engineers, project managers, machinists, and administration in order to develop a machine for the packaging industry.

Thank you Serpa packaging solutions for giving back to the Fresno Community in this cooperation with Lyle College of Engineering, Serpa has provided Fresno State Students with an incredible educational opportunity to gain industry experience at Fresno State.

Disclaimer: All photographs and CAD models are property of Serpa Packaging Solutions