

Side Airbag Static Deployment Fixture

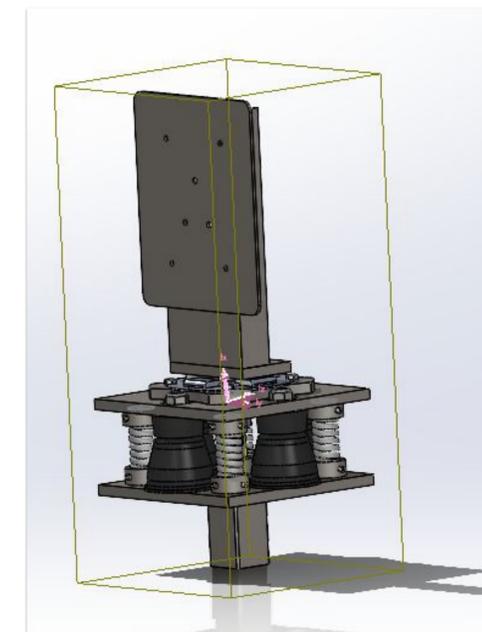
Project Description

- Autoliv uses a static test fixture to qualify in-seat airbags
- The current fixture causes damage to the airbags that isn't present when deploying from a seat
- A new fixture is needed that more accurately depicts how an airbag deploys from a seat

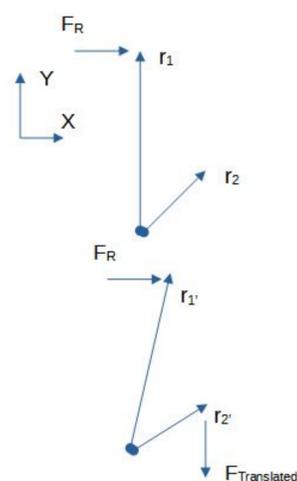
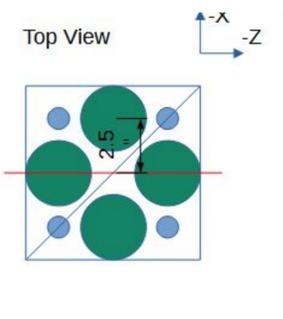


Design Description

- Springs dissipate excess energy to simulate the energy dissipated from tearing through seat foam and tear seam
- Air springs allow for adjustability
- U-joint in the middle prevents shear in springs
- Tractor clutch damper dissipate rotational energy



Performance Review



- Moments on the fixture were analyzed to verify deployment similarity
- The moment from force F_R causes a force transferred to the springs ($F_{translated}$) of 11.2 kN
- The selected springs are capable of reacting to 26.7 kN
- The fixture will handle the forces presented during an airbag deployment, resulting in a similar airbag deployment

Conclusion

- According to analysis, the design will result in similar deployment forces
- The design has range of motion on 3 axes, per sponsor's requirements
- Communication with the customer early in the design phase is critical to avoiding large and costly redesigns
- Manufacturing limitations of USU facilities and delays in the design process lead to wasted time and money. Understanding the school facilities and being more proactive with time could have avoided this waste
- Moving forward, more testing and tuning of spring rates is suggested

