Overview
Alcoa technicians take samples of Aluminum clad from rolls created for customers and ensure that all dimensions are within specification. The samples are clamped together to form a clad mount, in which the sides, edges, and corners are grind in order to be polished. In this process, technicians expose themselves to dangers associated with operating metal grinders with their hands. Mitigation of the risk of hand and bodily injury was sought out.

Objectives
A hands-free device to carry out grinding of the clad mount is desired. The device must be safe, user-friendly, ergonomic and robust.

Approach
- A trip was taken to the sponsor location to evaluate customer needs, observe clad mounts being grind, take samples of the clad mounts, and take measurements of the grinder.
- On-site, we met with the sponsors as well as the Alcoa technicians to address all concerns involved.
- Concepts were generated based on the mechanical motion of drill presses, Geneva mechanisms, material tensile testing machines as well as many others. SolidWorks computer-aided drawing was used to create images of initial concepts.
- Patents on these items and others were reviewed to determine pre-existing devices.
- Ideas culminated into a hand-held device which was modelled using SolidWorks.
- After consulting the sponsor, it was determined that a wall mount was preferred over a hand-held device because of safety concerns.
- Concepts and ideas were expanded upon, adjustments to the hand-held design were made, and a wall mount device was developed with the help of SolidWorks.
- A 3-D printed model was soon created to test and evaluate this concept.
- The prototype model was evaluated and deemed acceptable for the desired purpose. The actual design was then created and tested on a grinder to evaluate its usefulness for the sponsor.
- After testing was completed, the final design proved to meet all the criteria needed.

Outcomes
- The final device keeps the user’s hands away from the grinder, minimizing the risk of injury.
- The metal clamp can provide a more uniform and steady clamp force than a human hand, reducing the risk of the clad slipping out and becoming a projectile.