Our initial objective was to create a crutch attachment that would reduce the risk of injury for users in hazardous conditions. Our prototype successfully achieves this by incorporating an increased surface area at the bottom, mimicking that of a shoe, which enhances the crutch's stability and allows it to stand independently. Additionally, we've added a grip layer on the bottom surface to increase traction and prevent slippage, fulfilling our vision for a viable long-term solution as envisioned during the design phase.

Upon reviewing the final product, however, we identified several areas for improvement. The current design utilizes a permanent locking mechanism that wraps around the middle section, making it difficult to detach the crutch quickly. Ideally, this mechanism would be temporary and not require a screwdriver for adjustments. An improved design would feature a locking mechanism that can be easily tightened or loosened, providing stability when attached and allowing for quick detachment when necessary.

Further enhancements could include increasing the height that the lock reaches to potentially boost the stability of the crutch. Additionally, modifying the bottom to have a curved shape would better simulate the natural circular motion of human walking. This adjustment would help to smooth out the crutch’s movement, addressing the current rigidity introduced by the CrutchGuard.

These improvements would significantly enhance the usability and flexibility of the crutch attachment, making it even more effective for users navigating various environments.

We encountered several challenges throughout this project. Initially, we created plans and designs for a completely different product, which were quickly rejected when reevaluated for feasibility and alignment with our initial goals. In the week leading up to the deadline, we also scrambled to get our parts 3D printed, requiring two iterations of several components after discovering that our M6 pilot holes were too large for the heat inserts to function effectively.

Reflecting on the entire process, this project was both unique and introspective. It required us, as E29 students, to apply our knowledge from class—such as design, Geometric Dimensioning and Tolerancing (GD&T), and various manufacturing processes—and construct a prototype from brainstorming to fruition. This experience taught us how to delegate tasks effectively within our team, allowing individuals to engage in areas that matched their skills and strengths, and then combining our efforts to create the final product. Overall, despite the hurdles, the product was a success. We have gained valuable insights into teamwork, problem-solving, and the application of theoretical knowledge in practical engineering settings.