

# Personal Protective Equipment (PPE) By Kevin Saldana



## Problem statement

Welding operations present severe physical and radiation hazards, including intense arc heat, ultraviolet (UV) and infrared (IR) radiation, flying sparks, molten metal, and sharp materials. Without appropriate protective gear, welders face severe risks of permanent eye damage, facial burns, radiation burns, and skin cuts

## Methods

- Evaluated essential protective equipment—welding helmets, specialized gloves, and protective leather gear—for their safety performance
- Analyzed protective capabilities across various welding procedures, including Stick, MIG, and TIG welding processes
- Assessed material properties (such as dark lens filtering and natural heat resistance) to determine optimal combinations of safety, visibility, and comfort.

## Results

| Gear Type       | Key Protection Features                                                 | Application & Benefits                                                                    |
|-----------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Welding Helmet  | Dark lens; protection against UV/IR radiation, heat, sparks, and debris | Protects eyes, face, and neck; allows clear work visibility while guarding against burns. |
| Welding Gloves  | Heat, spark, molten metal, and UV resistance                            | Specific designs tailored for Stick, MIG, and TIG welding processes.                      |
| Leather Apparel | Natural heat resistance; protection against sparks, UV rays, and cuts   | Used in protective jackets, sleeves, and aprons for comfort and extreme durability.       |

## Discussion

- Personal Protective Equipment (PPE) serves as the indispensable primary defense against hazards in high-temperature working environments.
- Task-Specific Safety: Process-tailored gloves ensure flexibility and safety unique to MIG, TIG, or Stick applications
  - Sight & Thermal Protection: Dark lens technology allows precise visual control without exposing eyes to damaging arc radiation.
  - Material Efficacy: Leather remains the premier choice for full-body protection due to its unique combination of natural thermal insulation, cut resistance, and durability.

## Conclusions

- Welding helmets are essential for preventing permanent vision damage and severe facial burns from radiation and extreme arc heat
- Task-specific gloves and high-durability leather garments provide critical defense for hands and body against sparks, molten metal, and cuts