

DFMEA (RISK ANALYSIS)

Item	Function	Potential Failure	Potential Effect of Failure	SEV (Severity)	Potential Cause(s) of Failure	OCC (Occurrence)	DET (Detection)	RPN (Risk Priority Number)	Recommended Actions
Enhanced Communication	Robust two-way communication system	Communication system failure	Inability to relay crucial information, compromising safety	8	Signal interference, electronic component malfunction, battery failure	5	6	240	1. Implement Redundancy 2. Regular Testing 3. Signal Interference Analysis 4. Battery Health Monitoring 5. User Training
Advanced Environmental Sensing	High-precision sensors for temperature, humidity, and air quality	Environmental sensing system failure	Inaccurate monitoring of hazardous conditions	9	Sensor calibration issues, sensor damage, software glitches	4	7	252	1. Regular Calibration 2. Protective Housing for Sensors 3. Software Validation 4. Field Testing 5. User Training
Packaging	Packaging using carbon fiber or graphite materials	Packaging damage during transportation	Reduced protection during transportation	7	Impact during transportation, improper handling, material weakness	6	5	210	1. Impact Testing 2. Improved Handling Guidelines 3. Material Strength Testing 4. Quality Control Checks 5. Packaging Redesign
User Interface	User-friendly interface with customizable settings	User interface malfunction	Difficulty in operation and customization	6	Software bugs, compatibility issues, user error	4	6	144	1. Usability Testing 2. Compatibility Checks 3. User Training 4. Continuous Software Updates 5. User Feedback Collection
Product Interface	Use of HDPE or Polycarbonate Resin for the outer shell	Material failure	Reduced impact protection and comfort	8	Material degradation, improper moulding, manufacturing defects	5	5	200	1. Material Quality Control 2. Rigorous Impact Testing 3. Manufacturing Process Optimization 4. Regular Inspection 5. User Training
Biometrics Monitoring	Embedded sensors for vital signs like heart rate, temperature	Sensor malfunction	Inaccurate or no health monitoring data	9	Sensor calibration issues, sensor damage, electronic component failure	4	7	252	1. Regular Calibration 2. Protective Measures for Sensors 3. Component Reliability Testing 4. Field Testing 5. User Training
Real-Time Location Tracking	GPS technology for worker positioning	GPS tracking system failure	Inability to locate workers in real-time	7	Signal interference, satellite signal loss, GPS module malfunction	6	5	210	1. Signal Interference Analysis 2. Redundant GPS Systems 3. Satellite Signal Strength Monitoring 4. GPS Module Reliability Testing 5. User Training
Seamless Interaction	Instant voice communication capability	Communication system failure	Disruption in on-site collaboration and communication	8	Signal interference, electronic component malfunction, battery failure	5	6	240	1. Implement Redundancy 2. Regular Testing 3. Signal Interference Analysis 4. Battery Health Monitoring 5. User Training
Emergency Response Features	Panic button and fall detection sensors	Emergency response system failure	Delayed or no response in emergency situations	9	Sensor malfunction, electronic component failure, software glitches	4	7	252	1. Regular System Testing 2. Sensor Redundancy 3. Software Validation 4. Field Testing

									5. User Training
Productivity Enhancement	AR features for task-relevant information overlay	AR system malfunction	Inability to assist in complex tasks and troubleshooting	8	Software bugs, compatibility issues, electronic component failure	5	6	240	1. Usability Testing 2. Continuous Software Updates 3. Compatibility Checks 4. AR System Reliability Testing 5. User Training
Customizability for Different Industries	Tailored solutions for diverse work environments	Customization system failure	Inability to adapt to specific industry needs	7	Software bugs, compatibility issues, electronic component failure	6	5	210	1. Usability Testing 2. Continuous Software Updates 3. Compatibility Checks 4. System Reliability Testing 5. User Training
Aesthetic and Ergonomic Design	Ergonomically designed and visually appealing	Design and aesthetic failure	Reduced user acceptance and comfort	6	Design flaws, material aesthetics, user preferences	5	5	150	1. Design Validation Testing 2. Aesthetic Feedback Collection 3. Continuous Design Improvement 4. User Preferences Study 5. User Training
Durability and Battery Durability	Use of HDPE or Polycarbonate Resin for durability, Lithium-ion battery	Material or battery failure	Reduced durability and battery life	8	Material degradation, battery cell failure, charging issues	5	6	240	1. Material Quality Control 2. Battery Health Monitoring 3. Regular Inspection 4. Charging System Optimization 5. User Training
Comfort and Ergonomics	Ergonomic design for comfort and ease of use	Comfort and usability failure	Discomfort and fatigue during extended use	7	Poor design ergonomics, improper sizing, material discomfort	6	5	210	1. Ergonomic Design Validation 2. Continuous Design Improvement 3. Sizing Options 4. Material Comfort Testing 5. User Training
Environmental Compliance	Compliance with environmental safety standards	Environmental regulation non-compliance	Legal and ethical consequences	9	Material selection, manufacturing processes, waste disposal methods	4	7	252	1. Material Compliance Checks 2. Process Audits 3. Waste Disposal Compliance 4. Environmental Impact Assessments 5. User Training

SEV (Severity): Scale of 1-10 (10 being most severe) indicating the seriousness of the effect.

- **OCC (Occurrence):** Likelihood of failure occurring, rated on a scale of 1-10.

- **DET (Detection):** Ability to detect failure, rated on a scale of 1-10.

- **RPN (Risk Priority Number):** Calculated as SEV x OCC x DET, used to prioritize risks.