

Index

- Adaptive Neuro Fuzzy Inference System, 14
- Albeit fuzzy logic, 10
- Apollo Space program, 3, 4
- Application, fuzzy-based FMEA
 - detection, 68
 - fuzzy FMEA, 67
 - fuzzy logic-based FIS (Fuzzy Inference System) editor, 67–68
 - methodology, 62
 - objectives, 62
 - occurrence, 68
 - operations, 70–82
 - problem statement, 62
 - procedure, 65–67
 - severity, 68
 - steps, 68–69
 - surface diagram, 69
 - traditional failure mode and effects analysis (FMEA), 61–65
- Casting process operations
 - core inspection and storage, 41, 42
 - core making, 40–41
 - core painting, 41
 - derisering, 43–45
 - fettling, 45–46
 - final inspection of raw materials, 46, 47
 - inoculation and pouring, 43, 44
 - melting in induction furnace, 37–38
 - molding and core setting, 41–43
 - painting, 47
 - pattern and core box
 - manufacturing, 39–40
 - pattern plate preparations and lettering, 40
 - problems, 54–55
 - procurement, receipt of raw materials and consumables, 36
 - sand mixing and mold preparations, 38–39
 - shake out, 43, 45
 - shot blasting, 45, 46
 - storage of raw materials/consumables, 36–37
 - treatment and deslagging, 43, 44
- Cohesive hierarchical fuzzy inference system (CHFIS), 14
- Core making, 40–41
- Core painting, 41
- Core setting, 41–43
- Cotter pin boss milling, 52
- Cotter pin hole drilling, 50
- Cotter pin hole reaming, 51
- Data protection impact assessment (DPIA), 14
- Defuzzification, 21
- Degree of membership, 12
- Dempster-Shafer theory (DST), 14
- Derisering operation, 43–45
- Detection, 68
- Failure-free process, 2
- Failure mode and effects analysis (FMEA), 1–3
 - classification, 4–7
 - design, 6
 - detection, 4
 - development, 4, 5
 - effects of failure, 8
 - failure cause, 7–8
 - implementation, 141–142
 - objectives, 4, 5
 - occurrence, 4

- potential failure mode, 7
- procedure to perform, 9
- process FMEA (PFMEA), 6–7
- risk priority number (RPN), 8
- severity, 4
- team, 8
- types, 6
- vocabulary, 7–8
- Fault identifications, 114–131
- Fault tree analysis, 23–26
 - fault identifications, 114–131
 - fuzzy based FMEA, 100–114
 - methodology, 96–98
 - objectives, 96
 - potential failures identification, 98
 - problem formulation, 95–96
 - process FMEA, 99–100
 - quality and reliability measures, 95
- Feeder, 43
- Fettling, 45–46
- Fish Bone Diagram
 - Potential Risk K12, 82
 - Potential Risk K15, 82–83
- Ford Motor Company, 3, 4
- Forest Fire Vulnerability Index, 14
- Fuzzy axiomatic design (FAD), 14
- Fuzzy-based failure mode and effects
 - analysis, 20, 85–90
 - approach, 21–22
 - defuzzification, 21
 - fuzzy inference system (FIS), 22–23
 - linguistic variable, 21
 - steps, 22
- Fuzzy guideline, 11
- Fuzzy If-Then rules, 19
- Fuzzy induction framework, 11
- Fuzzy inference system (FIS), 15
 - Max-Min method, 2
- Fuzzy Lambda-Tau (FLT), 14
- Fuzzy logic, 9–11
 - applications, 13–20
 - rebalancing and optimization, 138–139
- Fuzzy logic-based FIS (Fuzzy Inference System) editor, 67–68
- Fuzzy membership function, 23
- Fuzzy risk priority number (FRPN), 19, 84, 91, 92, 142
- Fuzzy set, 11, 12
- Gang milling, 49
- Gate symbols, 25
- Global Warming, 14
- Grumman Aircraft Corporation, 3
- Hazard Analysis Critical Control Point (HACCP), 4
- Heuristic-based membership functions
 - determination (HBMFD), 14
- Interval type-2 fuzzy sets (IT2FSs), 14
- Interval-valued intuitionistic fuzzy sets (IVIFSs), 13
- Line balancing problem, 133–134
 - conventional method, 135–136
 - methodology, 135
 - problem analysis, 136–137
 - problem formulation, 134
 - rebalancing and optimization, 138–139
- Linguistic factors, 11
- Linguistic variables, 10
- Lukasiewicz's logic, 10
- Machining of rear Spring Bracket
 - base milling, 48–49
 - boring, 50
 - Cotter pin boss milling, 52
 - Cotter pin hole drilling, 50
 - Cotter pin hole reaming, 51
 - final inspection, 53
 - gang milling, 49
 - grease application, 54
 - mounting hole drilling, 51–52

- packing, 54
- primer and paint application, 47–48
- problems, 55–56
- sharp edge breaking, 52–53
- spot facing, 52, 53
- spring pin hole dia reaming, 51
- Maintenance plan, 2
- Max–Min method, 2, 68
- Membership functions, 12–13
- Microelectromechanical system (MEMS), 15
- Minimum cut sets (MCS) theory, 18
- Multi-attribute failure mode analysis (MAFMA), 19
- Multi-attributive border
 - approximation area
 - comparison (MABAC)
 - method, 13
- Occurrence, 68
- Operations management, 30–31, 133
- Potential failures identification, 98
- Potential Risk K12, 82
- Potential Risk K15, 82–83
- Process FMEA (PFMEA), 6–7
- Process time, 133
- Production line, 133
- Quality control
 - benefits, 28–29
 - continual improvement, 26
 - definition, 27
 - elements, 27
 - factors, 29–30
 - inspection, 30
 - objectives, 28
 - steps, 28
- Quantifiable risk-based approach, 14
- Reliability, availability, and maintainability (RAM), 14
- Risk analysis, 18
- Risk priority number (RPN), 2, 4, 8, 33, 61, 83, 84, 92, 141
 - threshold limits, 35
 - threshold value, 34
- Risk priority rank (RPR), 19
- Rule-based inference methodology using the evidential reasoning (RIMER), 16
- Rule Viewer, 23
- Severity, 68
- Shot blasting, 45, 46
- Standard Operating Procedure (SOP), 82
- Statistical analysis, 56–58
- Surface diagram, 69
- Tapping temperature, 37
- Time and motion study, 31–32
- Traditional failure mode and effects analysis, 3–4, 9, 33–34, 61–62, 142
 - casting process operations, 35–47
 - machining of rear Spring Bracket, 47–54
 - methodology, 34–35
 - problem formulation, 34
 - statistical analysis, 56–58
- Universe of discourse, 11–12