

# Control Types Effects on RPN Scores

| Control Type             | Control Description   | Severity | Occurrence | Detection |
|--------------------------|---|----------|------------|-----------|
| Condition Monitoring     | Predictive Maintenance (e.g. Vibration, Oil Analysis, Thermography)           | ↔        | ↔          | ↓         |
| Condition Monitoring     | Offline Condition Monitoring (e.g. Ultrasonic thickness, HiPOT, Current draw) | ↔        | ↔          | ↓         |
| Condition Monitoring     | Online condition monitoring (e.g. diff P on a DCS)                            | ↔        | ↔          | ↓         |
| MRO                      | Stocking a Spare Part   | ↓        | ↔          | ↔         |
| Repair/Replace           | Precision Maintenance (e.g. Lubrication, alignment, cleaning)                 | ↔        | ↓          | ↔         |
| Repair/Replace           | Replace wear out parts based on time  | ↔        | ↓          | ↔         |
| Repair/Replace           | Replace random failure parts based on time (e.g. electronics)                 | ↔        | ↔          | ↔         |
| Repair/Replace           | Replace wear out parts based on # of uses/cycles                              | ↔        | ↓          | ↔         |
| Repair/Replace           | Replace wear out parts based on actual condition                              | ↔        | ↓          | ↔         |
| Design / Modification    | Redundancies  | ↔        | ↓          | ↔         |
| Design / Modification    | Interlocks  | ↓        | ↔          | ↔         |
| Design / Modification    | Alarm (e.g. Pressure diff starting to increase towards limit)                 | ↔        | ↔          | ↓         |
| Design / Modification    | Protection Devices / Relief Devices   | ↓        | ↔          | ↔         |
| Design / Modification    | More robust part/component installed  | ↔        | ↓          | ↔         |
| Design / Modification    | More robust system design (i.e. designing out problem areas)                  | ↓        | ↔          | ↔         |
| Inspection               | Maintenance / Operator Inspections (Visual)                                   | ↔        | ↔          | ↓         |
| Inspection               | Unofficial (Undocumented/uncontrolled) Operator / Maintenance Inspections     | ↔        | ↔          | ↔         |
| Functional Test          | Functional Tests before a production run                                      | ↔        | ↔          | ↓         |
| Functional Test          | Time-based functional tests (e.g. annual performance test)                    | ↔        | ↔          | ↓         |
| Functional Test          | Failure Finding Test  | ↔        | ↔          | ↓         |
| Functional Test & Repair | Calibration   | ↔        | ↓          | ↓         |