

# Common FMEA Challenges

## Historic Challenges?



## Define Success?



## Future Potential?

“Takes too long & too complicated, difficult to navigate”

“Dedicated time and people to support, constant scope creep”

“Inconsistent Scoring of Severity, Occurrence and Detection”

“Many people involved, session descend into talking sessions”

“SC & CC definition - constant discussion between departments on FMs FCs & FEs

“Generic DFMEA that is easy to understand, with links to DVP”

“Relevant control identified not just SCs & CCs”

“Generic DFMEA prepared for components, which can be tailored

“SC & CC justification to wider business, and lead DFMEA with customers”

“Knowledge is captured and accessed across the business and not **lost**”

“Risk based mindset in the business”

“lead workshops with customers to manage their tech & product development risk”

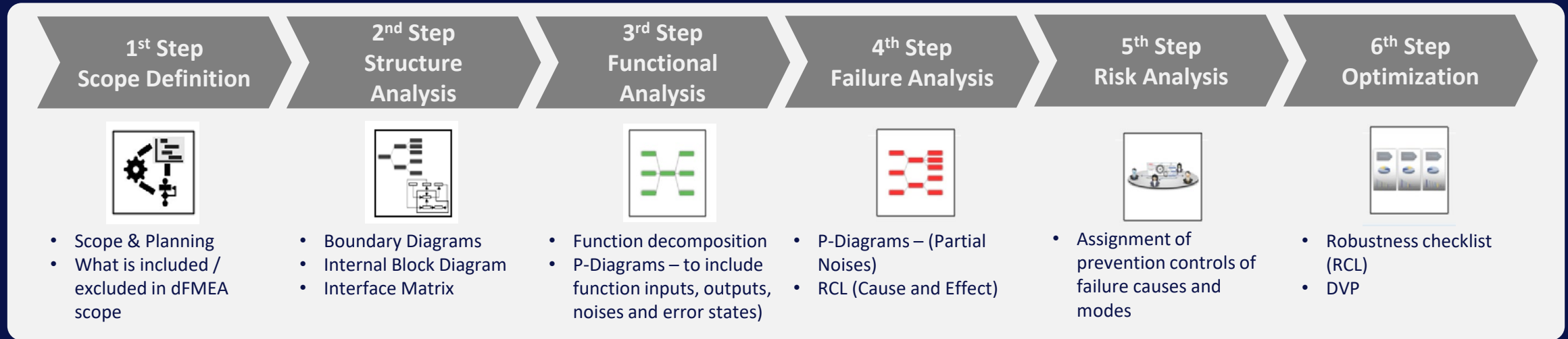
“Anticipate potential faults in customer products ”

“Build and Document company knowledge”

“Roll out to the PFMEA”

“Live valued added document process which facilitates training & robust design”

# Case Study - UKBIC DFMEA

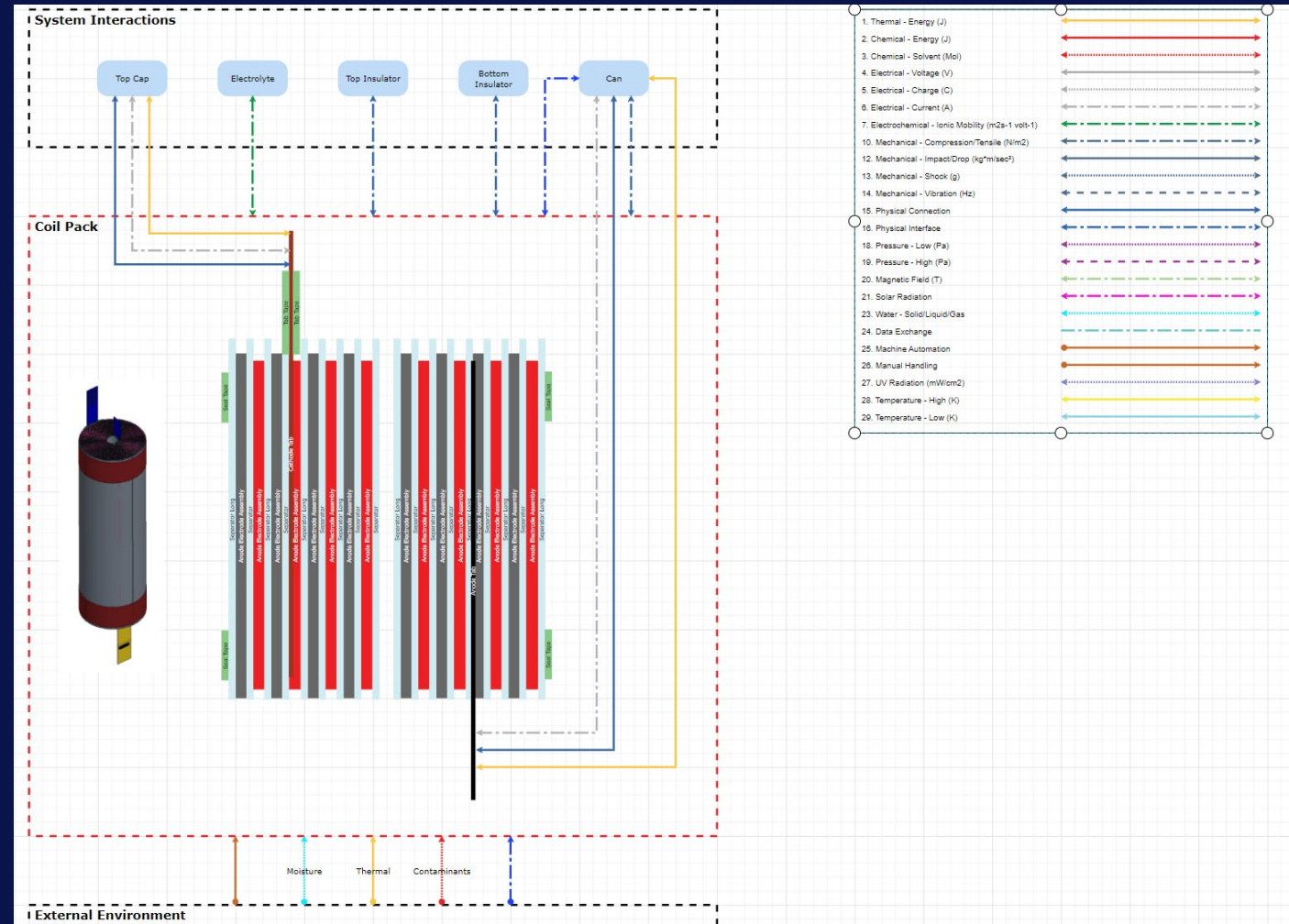


- TJ Digital were approached to develop UKBICs NMC 21700 Design FMEA
- Structured approach using AIAG VDA 2019 standard was selected
- The scope of work included boundary, diagram, p-diagram and worksheet creation, with total time to deliver estimated at 200 hours
- A full structure analysis of eBOM from product to material level was undertaken to understand Failure Effects, Modes & Causes.
- ~1500-line FMEA worksheet for all eBOM items

# Case Study - UKBIC DFMEA

Boundary diagrams are a systematic way to capture:

1. Visual representation of systems
2. Energy transfers / flows
3. Interfaces between systems
4. Functions of system, sub-system and component.
5. External environment influences



# Case Study - UKBIC DFMEA



DIGITAL SYSTEMS

**BD** Boundary Diagram    **PD** P-Diagram

Cell - Product

- Cell - Formed
  - Top Cap
  - Top Insulator
  - Electrolyte
  - Coil Pack
    - Anode Electrode**
      - Anode Coat - Phantom
        - Anode Formulation - Phantom
          - Anode Active 1 Material - Gr
          - Anode Active 2 Material - SiOx
          - Conductive Additive Material - C65
          - Anode Binder 1 Material - CMC
          - Anode Binder 1 Solution - SBR
          - Anode Solvent - DI
        - Anode Current Collector
        - Anode Tab
        - Cover Tape
      - Separator
      - Cathode Electrode
        - Separator
        - Seal Tape
      - Bottom Insulator
      - Can
      - Ring Insulator
      - Cell Sleeving
      - Cell Identification

**DW** DFMEA Worksheet    **DV** DVP&R

Workflow: RISK ANALYSIS (STEP 5) - Overdue by 187 days

K-Bank Change Reference	STRUCTURE ANALYSIS (STEP 2)			FUNCTION ANALYSIS (STEP 3)			FAILURE ANALYSIS (STEP 4)			
	Next Higher Level	Focus Element	Next Lower Level	Next Higher Level Function and Requirement	Focus Element Function and Requirement	Next Lower Level Function and Requirement	Failure Effect (FE) to the Next Higher Level Element	Severity (S) of FE	Failure Mode (FM) of the Focus Element	Failure Cause (FC) of the Next Lower Element or Characteristic
1	Cell Pre-Filled Electrolyte	Electrolyte Formulation			F(x) Promote the movement of ions between anode electrode / separator / cathode electrode (bi-directional)	F(x) Good ionic conductivity, electrically insulating, good chemical and electrochemical stability, high transfer number	Cell capacity reduction	7	Reduced sodium ion concentration, leading to a reduction in movement of ions between electrodes.	Electrolyte impurities out of specified limits
2							Cell cycle life reduction	7		Electrolyte specification incorrect by design
3										Chemical side reactions between sodium salt, electrodes and separator
4										Degradation/Decomposition of electrolyte (HF Generation)
5										Electrolyte amount too low
6										High C-rates
7										Glue strip type & material finish incorrect
8							Cell capacity reduction	7	Higher moisture content leading to excessive gas generation from electrolyte (cell swelling)	Electrolyte impurities out of specified limits
9							Cell cycle life reduction	7		Electrolyte moisture content too high
10										Chemical side reactions between sodium, electrodes and separator
11										Degradation/Decomposition of electrolyte (HF Generation)
12							Cell capacity reduction	7	High HF concentration	Electrolyte impurities out of specified limits
13							Cell cycle life reduction	7		Chemical side reactions between sodium, electrodes and separator
14							Destruction of internal cell components	8		Corrosion of the laminate pouch material
							Degradation of internal cell components	7		Electrolyte concentration incorrect
										Electrolyte shelf life

Design FMEA    To Form

**DFMEA SmartSuggest**

There are no suggestions available.

Show

All values

Select all    Clear all    Refresh

Suggestions

There are no suggestions available.

Connect

Insert