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NR/L2/ELP/21088

Module 05 – Mark 3A Maintenance Parameters

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1 Scope

This module of NR/L2/ELP/21088 covers:

- a) Equipment Design;
- b) Equipment Design Variations;
- c) Equipment Design Designations;
- d) Environmental Conditions;
- e) Maximum Pantograph Operational Speeds;
- f) Continuous Current Carrying Capacity;
- g) Design Staggers and Deviation;
- h) Minimum Staggers;
- i) Design Heights;
- j) Heel Settings;
- k) Track Tolerances;
- l) Maximum Dropper Spacing;
- m) Conductor Particulars;
- n) Conductor Tensions;
- o) Factor of Safety.

2 Definitions

See Glossary (NR/L2/ELP/21088/01)

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3 Equipment Design

The Mk3A design is defined as a simple catenary system for main lines, and a single contact wire system (tramway) for sidings.

The Mk3A system design is an updated replacement to the Mk3 system and was used on electrification schemes from the introduction of the Weaver Junction (North of Crewe) – Glasgow portion of the WCML electrification in 1971, as well as the Great Northern section of the ECML, from Kings Cross and Drayton Park to Royston, including the Hertford Loop in 1977. A stitched catenary was introduced with higher conductor tensions on the WCML. A single contact wire trolley wire system was set up on the Shield Muir Spur in Scotland. The major changes being the introduction of aluminium based catenary and the encumbrance being reduced to 900mm on cantilevers.

4 Equipment Design Variations

Within the design range of Mk3A equipment there are variations for slow, medium and high speed and for Fixed Termination (F.T), Auto-tensioned (A.T.), Tramway (T) and Trolleywire (TW) equipments. Some equipment variants are due only to local restrictions and/or historical developments of the equipment.

Variation	Description
Mk3A-00	Original design
Mk3A-01	Increased tension in conductors to combat 'blow off'.
Mk3A-02	Increased tension and free contact wire uplift at support points, required for higher speeds.
Mk3A-03	Increased tension in conductors, stitched.
Mk3A-04	Single contact wire trolleywire system, auto-tensioned with a 65m maximum span.

Table 1 – Equipment design variations

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5 Equipment Design Designations

- The equipment design designations are detailed in table 2.

Variation	Designation
Mk3A-00	Mk3A-00-AT-S
	Mk3A-00-AT-T
	Mk3A-00-FT
	Mk3A-00-FT-T
	Mk3A-00-FT/T
Mk3A-01	Mk3A-01-AT-S-ST
Mk3A-02	Mk3A-02-AT-S-ST
Mk3A-03	Mk3A-03-AT-S-ST
Mk3A-04	Mk3A-04-AT-TW

Table 2 – Equipment designations

6 Environmental Conditions

- The Equipment is designed for the following environmental conditions:

Designation	Temperature Ranges (Deg C)			Wind Speed (m/s)
	Min	Max	Design	
Mk3A-00	-18	38	10	27.8
Mk3A-01	-18	38	10	27.8
Mk3A-02	-18	38	10	27.8
Mk3A-03	-18	38	10	27.8
Mk3A-04	-18	38	10	27.8

Table 3 – Environmental Conditions