



Bonneagar Iompair Éireann
Transport Infrastructure Ireland

TII Publications

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Method of Measurement for Road Works Series MM 1800 - Structural Steelwork

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About TII

Transport Infrastructure Ireland (TII) is responsible for managing and improving the country's national road and light rail networks.

About TII Publications

TII maintains an online suite of technical publications, which is managed through the TII Publications website. The contents of TII Publications is clearly split into 'Standards' and 'Technical' documentation. All documentation for implementation on TII schemes is collectively referred to as TII Publications (Standards), and all other documentation within the system is collectively referred to as TII Publications (Technical). This system replaces the NRA Design Manual for Roads and Bridges (NRA DMRB) and the NRA Manual of Contract Documents for Road Works (NRA MCDRW).

Document Attributes

Each document within TII Publications has a range of attributes associated with it, which allows for efficient access and retrieval of the document from the website. These attributes are also contained on the inside cover of each current document, for reference. For migration of documents from the NRA and RPA to the new system, each current document was assigned with new outer front and rear covers. Apart from the covers, and inside cover pages, the documents contain the same information as previously within the NRA or RPA systems, including historical references such as those contained within NRA DMRB and NRA MCDRW.

Document Attributes

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NRA DMRB and MCDRW References

For all documents that existed within the NRA DMRB or the NRA MCDRW prior to the launch of TII Publications, the NRA document reference used previously is listed above under 'historical reference'. The TII Publication Number also shown above now supersedes this historical reference. All historical references within this document are deemed to be replaced by the TII Publication Number. For the equivalent TII Publication Number for all other historical references contained within this document, please refer to the TII Publications website.

Series 1800: Structural Steelwork

Fabrication and Erection of Steelwork

- | | |
|-------------|--|
| Units | <p>1 The unit of measurement shall be:</p> <ul style="list-style-type: none">(i) fabrication, permanent erection..... tonne.(ii) trial erection at the place of fabrication.....item. |
| Measurement | <p>2 The measurement shall be the computed mass of the finished member comprising plates, rolled sections, shear connectors, stiffeners, cleats, packs, splice plates and all fittings, without allowance for tolerances for rolling margin and other permissible deviations from standard masses or nominal dimensions, and excluding the masses of welds, bolts, nuts, washers, rivets and protective coatings. No deductions shall be made for notches, cope holes, bolt and rivet holes, and the like, which are each less than 0.03 square metres.</p> <p>The computed mass of rolled and cast steel shall be determined from the dimensions shown on the Drawings on the following basis:</p> <ul style="list-style-type: none">(a) rolled or cast steel 7850 kilogrammes per cubic metre; <p>3 Deck panels shall be measured separately only when the deck panel is not integral with the main member. Bracings, external diaphragms and the like shall be measured separately as subsidiary steelwork only when they are not integral with main members or deck panels.</p> <p>4 Main members and deck panels shall be inclusive of connectors, stiffeners, internal diaphragms and other integral components.</p> |

Fabrication of Steelwork

- Itemisation **5** Separate items shall be provided for fabrication of steelwork in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Fabrication
II	1 Main members
	2 Deck Panels
	3 Subsidiary steelwork
III	1 Rolled Sections
	2 Plated rolled sections
	3 Plated Girders
	4 Box girders
IV	1 Comprised of different combinations of grades of steel
V	1 Curved on plan or elevation
VI	1 Tapering

- Fabrication** **6** The items for fabrication shall be in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item Coverage
- (a) examining and checking for segregation, laminations, cracks and surface flaws and carrying out any remedial measures required by the Employer's Representative in respect of such defects;
 - (b) cutting, marking off, drilling notching, machining, treatment of outside arrises, smoothing to slopes, form fitting, end and edge preparation and cambering;
 - (c) riveting, bolting assembling and pre-heating;
 - (d) welds, packing plates, rivets, bolts (including holding down bolts), nuts and washers required to fabricate and to complete the erection and installation on Site, together with spares and service bolts, drifts, draw up cleats and the like;
 - (e) pre-production procedural trials;
 - (f) welder approval trials and provision of certificates;
 - (g) allowance for rolling margins, over-runs and other permissible deviations;
 - (h) checking of deviations in plate panels and rolled and built up sections and of alignment at joints, including taking measurements and observations and recording and supplying one copy of the records to the Employer's Representative;

- (i) preparation and supply of marked erection drawings, marking members for identification and delivery in matching sequence;
- (j) in the case of weather resistant steel, blast cleaning after fabrication;

Erection of Steelwork

Itemisation

- 7** Separate items shall be provided for erection of steelwork in accordance with Chapter II paragraphs 3 and 4 and the following;

Group	Feature	
I	1	Trial erection at the place of fabrication
	2	Permanent erection
II	1	Different forms of steel substructure construction
	2	Different forms of steel superstructure construction

Trial Erection at the Place of Fabrication

- 8** The items for trial erection at the place of fabrication shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item Coverage

- (a) temporary bracing or stays to prevent displacement including the provision and removal of temporary attachments;
- (b) proving dimensions, cambers and profiles and alignment at joints;
- (c) match-making members as required for permanent erection;
- (d) dismantling;
- (e) modifications and refitting of members as a result of the trial erection;
- (f) bolts, nuts, washers, sockets, base plates, anchorage assemblies, drilling or forming holes and pockets and casting in;

Permanent Erection

9 The items for permanent erection shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item Coverage

- (a) temporary bracing or stays to prevent displacement including the provision and removal of temporary attachments;
- (b) welder approval trials and provision of certificates;
- (c) procedural trials
- (d) permanent bolted, riveted and welded connections including the provision of preheat and shelters for welding;
- (e) checking of deviations in plate panels and rolled and built-up sections and of alignment at joints, including taking measurements and observations and recording and supplying one copy of the records to the Employer;
- (f) drilling or forming holes and pockets and casting in bars, sockets, base plates and anchorage assemblies;
- (g) adhesives and epoxy or polyester mortar, bedding mortar or grout.

Miscellaneous Metalwork

Definition

10 Miscellaneous metalwork shall comprise items of metalwork incorporated into structures and shall include ladders, brackets, handrails, access covers and frames, mesh panels, walkway panels, screens, grilles and the like.

Units

11 The unit of measurement shall be:

- (i) miscellaneous metalwork.....number.

Measurement

12 Items of metalwork which are:

- (a) included in the computed weight of fabricated items; or
- (b) included in other measured items; or
- (c) separately measured elsewhere;

shall not be measured as miscellaneous metalwork.

- Itemisation **13** Separate items shall be provided for miscellaneous metalwork in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Miscellaneous metalwork
II	1 Different types
III	1 Different materials
IV	1 Different sizes

- Miscellaneous Metalwork** **14** The items for miscellaneous metalwork shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) Fabrication (as this Series paragraph 6);
 - (b) erection (as this Series paragraphs 8 and 9);
 - (c) protective system (as Series 1900 paragraph 4);
 - (d) in situ concrete (as Series 1700 paragraph 5);
 - (e) formwork (as Series 1700 paragraph 15)

Corrugated Steel Buried Structures

- Units **15** The unit of measurement shall be:
- (i) corrugated steel buried structures (stating the length) number.

- Measurement **16** The length stated shall be the extreme length of the corrugated steel buried structure.

- Itemisation **17** Separate items shall be provided for corrugated steel buried structures in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Corrugated steel buried structures
II	1 Different types
III	1 Different sizes
IV	1 Different thickness or gauge

Corrugated Steel Buried Structures

18 The items for corrugated steel buried structures shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item Coverage

- (a) cutting, marking off, drilling, notching, bevels, skew, bends, edge preparation, cambering, riveting, bolting and fabricating;
- (b) marking members for identification and delivery in matching sequence;
- (c) laps, rivets, bolts, nuts, washers and the like, spares and service bolts, drifts, draw up cleats and the like;
- (d) protective systems (as Series 1900 paragraph 4)
- (e) channels;
- (f) awaiting the results of tests;
- (g) paved invert

Metal Facing Units for Reinforced Earth Structures

Units

- 19** The units of measurement shall be:
- (i) metal facing units square metre.
 - (ii) metal capping units and the like linear metre.

Measurement

20 The measurement of metal facing units shall be the plane underdeveloped area of the facing.

The measurement of metal capping units and the like shall be the measurement along the centre line.

Itemisation

21 Separate items shall be provided for metal facing and capping units in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Metal facing units
	2 Metal capping units and the like
II	1 Different materials
III	1 Different types
IV	1 Different thicknesses or gauge
V	1 Curved on plan
VI	1 Built to a batter

**Metal Facing Units and
Capping Units**

22 The items for metal facing units and capping units shall in accordance with the Preamble to the Bill of Quantities General Directions include for:

Item Coverage

- (a) fabrication (as this Series paragraph 6);
- (b) permanent erection (as this Series paragraph 9);
- (c) protective system (as Series 1900 paragraph 4);
- (d) threading over vertical rods;
- (e) sealing joints;
- (f) connection to reinforcing elements;
- (g) matching as required.



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