

Series 400: Safety Fences, Safety Barriers and Pedestrian Guardrails

Definition

1 The term “beam” shall mean a longitudinal member spanning posts and mounting brackets within the limits defined in paragraph 4 below. The term “mounting bracket” shall be deemed to include the term “bridge pier or concrete parapet mounting connection”.

2 The term ‘wire rope’ shall mean the complete rope system for the wire rope safety fence comprising upper and lower ropes together with inherent component ropes of all types and tail ropes but excluding safety check ropes.

Beam Safety Fences

Units

3 The units of measurement shall be:

(i) beams.....linear metre.

(ii) posts, mounting brackets, terminal sections, full height anchorages, expansion joint anchorages, connections to bridge parapets, connection pieces, concrete foundations and socketed foundations to posts.....number.

Measurement

4 The measurement of beams shall be the developed length along the centre line of the beams or in the case of double sided fences and double rail fences, measured once only along the centre line of the posts, between the following points:

(a) the end of each beam type at a connection to bridge parapet or within a connection piece assembly;

(b) the connection of beams to terminal sections, full height anchorages and expansion joint anchorages.

5 The measurement of terminal sections, full height anchorages, expansion joint anchorages and connections to bridge parapets shall be the complete installation. Mounting brackets and all other posts required between those points defined in Paragraph 4 shall be measured. Concrete foundations and socketed foundations to posts, between those points defined in Paragraph 4, shall only be measured for those locations stated in the Contract.

6 The measurement of connection pieces shall be the complete installation.

7 The measurement of expansion joint anchorages shall be for each anchorage on each side of the expansion joint.

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- (g) drilling or forming holes and pockets and casting in bolts, base plates and anchorage assemblies;
 - (h) bedding;
 - (i) filling;
 - (j) proof loading.
- Mounting Brackets**
- 11 The items for mounting brackets shall in accordance with the Preambles to Bill of Quantities General Directions include for:
- Item Coverage
- (a) fabrication (as Series 1800 Paragraph 6);
 - (b) protective system (as Series 1900 paragraph 4);
 - (c) fixing to structures including adaptor platforms;
 - (d) fixing to beam;
 - (e) drilling or forming holes and pockets and casting in bolts, base plates and anchorage assemblies.
- Terminal Sections, Full Height Anchorages, Expansion Joint Anchorages, Connections to Bridge Parapets and Connection Pieces**
- 12 The items for terminal sections, full height anchorages, expansion joint anchorages, connections to bridge parapets and connection pieces shall in accordance with the Preambles to Bill of Quantities General Directions include for:
- Item Coverage
- (a) posts (as this Series paragraph 10);
 - (b) beams (as this Series paragraph 9);
 - (c) excavation in any material (as Series 600 paragraphs 17, 18, 19 and 23);
 - (d) concrete (as Series 1700 paragraphs 4 and 9);
 - (e) formwork (as Series 1700 paragraph 14);
 - (f) reinforcement (as Series 1700 paragraph 25);
 - (g) disposal of material (as Series 600 paragraph 39);
 - (h) fixing to or setting in concrete;
 - (i) terminal end shoes;
 - (j) precast concrete fairings;
 - (k) in the case of terminal sections to untensioned corrugated beam, acceptable material, ramp, backfilling and compaction;
 - (l) casings and plastic sheeting;
 - (m) sockets, socket covers and filling.

Concrete Foundations to Posts

13 The items for concrete foundations to posts shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item Coverage

- (a) excavation in any material (as Series 600 paragraphs 17, 18, 19 and 23);
- (b) disposal of material (as Series 600 paragraph 39);
- (c) concrete (as Series 1700 paragraphs 4 and 9);
- (d) formwork (as Series 1700 paragraph 14);
- (e) reinforcement (as Series 1700 paragraph 25);
- (f) plastic sheeting;
- (g) casings.

Socketed Foundations to Posts

14 The items for socketed foundations to posts shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item Coverage

- (a) fabrication (as Series 1800 paragraph 6);
- (b) protective system (as Series 1900 paragraph 4);
- (c) concrete foundations to posts (as this Series paragraph 13);
- (d) socket covers and fillings.

Remove from Store and Re-erect Beam Safety Fences

Units

15 The units of measurement shall be:

- (i) remove from store and re-erect beams.....linear metre.
- (ii) remove from store and re-erect posts, mounting brackets, terminal sections, full height anchorages, expansion joint anchorages, connections to bridge parapets, connection pieces, number.
- (iii) concrete foundations and socketed foundations to re-erected posts..... number.

Measurement

16 The measurement of re-erected beam safety fences shall be in accordance with paragraphs 4, 5, 6 and 7 of this Series.

Itemisation

- 17** Separate items shall be provided for remove from store and re-erect beam safety fences in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Each type of re-erected beam
	2 Each type of re-erected post
	3 Each type of re-erected mounting bracket
	4 Each type of re-erected terminal section
	5 Each type of re-erected full height anchorage
	6 Each type of re-erected expansion joint anchorage
	7 Each type of re-erected connection to bridge parapet
	8 Each type of re-erected connection piece
	9 Each type of concrete foundation to re-erected post
	10 Each type of socketed foundation to re-erected post
II	1 Straight or curved exceeding 120 metres radius
	2 Curved exceeding 50 metres radius but not exceeding 120 metres radius
	3 Curved not exceeding 50 metres radius

Remove from Store and Re-erect Beams

Item Coverage

- 18** The items for remove from store and re-erect beams shall in accordance with the Preambles to Bill of Quantities General Directions include for:
- (a) loading, transporting from store, unloading and positioning for re-erection;
 - (b) replacing items damaged during the foregoing operations;
 - (c) modification and new materials;
 - (d) beams (as this Series paragraph 9);
 - (e) making good to protective system.

Remove from Store and Re-erect Posts

Item Coverage

- 19** The items for remove from store and re-erect posts shall in accordance with the Preambles to Bill of Quantities General Directions include for:
- (a) loading, transporting from store, unloading and positioning for re-erection;
 - (b) replacing items damaged during the foregoing operations;
 - (c) modification and new materials;
 - (d) posts (as this Series paragraph 10);
 - (e) making good to protective system.

Remove from Store and Re-erect Mounting Brackets

20 The items for remove from store and re-erect mounting brackets shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item Coverage

- (a) loading, transporting from store, unloading and positioning for re-erection;
- (b) replacing items damaged during the foregoing operations;
- (c) modification and new materials;
- (d) mounting brackets (as this Series paragraph 11);
- (e) making good to protective system.

Remove from Store and Re-erect Terminal Sections, Full Height Anchorages, Expansion Joint Anchorages, Connections to Bridge Parapets and Connection Pieces

21 The items for remove from store and re-erect terminal sections, full height anchorages, expansion joint anchorages, connections to bridge parapets and connection pieces shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item Coverage

- (a) loading, transporting from store, unloading and positioning for re-erection;
- (b) replacing items damaged during the foregoing operation;
- (c) modification and new materials;
- (d) terminal sections, full height anchorages, expansion joint anchorages, connections to bridge parapets and connection pieces (as this Series paragraph 12);
- (e) making good to protective system.

Concrete Foundations and Socketed Foundations to Re-erected Posts

22 The items for concrete foundations and socketed foundations to re-erected posts shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item Coverage

- (a) concrete foundations to posts (as this Series paragraph 13);
- (b) socketed foundations to posts (as this Series paragraph 14).

Post Extension Units

Units

23 The unit of measurement shall be:

- (i) post extension units number.

Itemisation	24	Separate items shall be provided for post extension units in accordance with Chapter II paragraphs 3 and 4 and the following:						
		<table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 10%;">Group</th> <th style="text-align: left; width: 10%;">Feature</th> <th></th> </tr> </thead> <tbody> <tr> <td style="border-top: 1px solid black;">I</td> <td style="border-top: 1px solid black;">1</td> <td style="border-top: 1px solid black;">Each type of post extension unit</td> </tr> </tbody> </table>	Group	Feature		I	1	Each type of post extension unit
Group	Feature							
I	1	Each type of post extension unit						
Post Extension Units	25	The items for post extension units shall in accordance with the Preambles to Bill of Quantities General Directions include for:						
Item Coverage		<ul style="list-style-type: none"> (a) fabrication (as Series 1800 paragraph 6); (b) protective system (as Series 1900 paragraph 4); (c) drilling existing posts; (d) fixing to existing posts. 						
		Raising Existing Sockets						
Units	26	The unit of measurement shall be:						
		(i) raising existing sockets.....number.						
Itemisation	27	Separate items shall be provided for raising existing sockets in accordance with Chapter II paragraphs 3 and 4 and the following:						
		<table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 10%;">Group</th> <th style="text-align: left; width: 10%;">Feature</th> <th></th> </tr> </thead> <tbody> <tr> <td style="border-top: 1px solid black;">I</td> <td style="border-top: 1px solid black;">1</td> <td style="border-top: 1px solid black;">Raising each type of existing socket</td> </tr> </tbody> </table>	Group	Feature		I	1	Raising each type of existing socket
Group	Feature							
I	1	Raising each type of existing socket						
Raising Existing Sockets	28	The items for raising existing sockets shall in accordance with the Preambles to Bill of Quantities General Directions include for:						
Item Coverage		<ul style="list-style-type: none"> (a) removing existing posts and setting aside for re-use; (b) cleaning out sockets; (c) in situ concrete (as Series 1700 paragraph 4); (d) formwork (as Series 1700 paragraph 14); (e) loading, transporting from store, unloading and positioning for re-erection; (f) removing from store and re-erecting posts (as this Series paragraph 19); (g) replacing items damaged during the foregoing operations; (h) making good to protective systems. 						

Wire Rope Safety Fence

- Units **29** The units of measurement shall be:
- (i) wire rope linear metre;
 - (ii) posts, intermediate anchorages, end anchorages, concrete foundations and socketed foundations to posts..... number.

- Measurement **30** The measurement of wire rope shall be the undeveloped length measured once only along the centre line of the fence on plan from midway between the anchor blocks at one end to midway between the anchor blocks at the other end.
- 31** The measurement of intermediate anchorages and end anchorages shall be the complete installation.
- Concrete foundations and socketed foundations shall only be measured for those locations stated in the Contract.

- Itemisation **32** Separate items shall be provided for wire rope safety fences in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Wire rope
	2 Each type of post
	3 Each type of intermediate anchorage
	4 Each type of end anchorage
	5 Each type of concrete foundation to post
	6 Each type of socketed foundation to posts

- Wire Rope** **33** The items for wire rope shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item Coverage (a) fabrication (as Series 1800 paragraph 6);
- (b) protective system (as Series 1900 paragraph 4);
- (c) rigging screws, threaded terminals, attachments, fittings and fixings;
- (d) adjustments and tensioning;
- (e) threading ropes into and around posts.

Posts

34 The items for posts shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item Coverage

- (a) fabrication (as Series 1800 paragraph 6);
- (b) protective system (as Series 1900 paragraph 4);
- (c) driving in any material;
- (d) fixing to structures including attachment systems;
- (e) post caps, excluders, hooks and fittings;
- (f) drilling or forming holes and pockets and casting in bolts, base plates, sockets and anchorage assemblies;
- (g) bedding;
- (h) facilities for Engineer's proof loading;
- (i) proof loading;
- (j) filling.

**Intermediate Anchorages
and End Anchorages**

35 The items for intermediate anchorages and end anchorages shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item Coverage

- (a) fabrication (as Series 1800 paragraph 6);
- (b) protective system (as Series 1900 paragraph 4);
- (c) excavation in any material (as Series 600 paragraphs 17, 18, 19 and 23);
- (d) concrete (as Series 1700 paragraphs 4 and 9);
- (e) formwork (as Series 1700 paragraph 14);
- (f) reinforcement (as Series 1700 paragraph 25);
- (g) disposal of material (as Series 600 paragraph 39);
- (h) safety check ropes, fork terminals, pins, thimbles, ferrules, attachments, fixings and fittings;
- (i) anchor frames, surface mounted anchors and sockets;
- (j) fixing to anchor block including attachment systems;
- (k) drilling or forming holes and pockets and casting in bolts, base plates, sockets and anchorage assemblies.

Concrete Foundations to Posts

- 36** The items for concrete foundations to posts shall in accordance with the Preambles to Bill of Quantities General Directions include for:
- Item Coverage
- (a) excavation in any material (as Series 600 paragraphs 17, 18, 19 and 23);
 - (b) disposal of material (as Series 600 paragraph 39);
 - (c) concrete (as Series 1700 paragraphs 4 and 9);
 - (d) formwork (as Series 1700 paragraph 14);
 - (e) reinforcement (as Series 1700 paragraph 25);
 - (f) plastic sheeting;
 - (g) casings.

Socketed Foundations to Posts

- 37** The items for socketed foundations to posts shall in accordance with the Preambles to Bill of Quantities General Directions include for:
- Item Coverage
- (a) fabrication (as Series 1800 paragraph 6);
 - (b) protective system (as Series 1900 paragraph 4);
 - (c) concrete foundations to posts (as this Series paragraph 36);
 - (d) socket covers and filling.

Concrete Safety Barriers

- 38** The units of measurement shall be:
- (i) concrete safety barriers.....linear metre.
 - (ii) concrete safety barrier terminations, transitions....number.
- 39** The measurement of concrete safety barriers shall be the developed length along the centre line of the barriers between terminations.
- 40** Separate items shall be provided for concrete safety barriers in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Each type of barrier
	2 Each type of termination
	3 Each type of transition
II	1 Straight or curved exceeding 50 metres radius
	2 Curved not exceeding 50 metres radius

Concrete Safety Barriers

41 The items for concrete safety barriers shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item Coverage

- (a) excavation in any material (as Series 600 paragraphs 17, 18, 19 and 23);
- (b) disposal of material (as Series 600 paragraph 39);
- (c) concrete (as Series 1700 paragraph 4 and 9);
- (d) formwork (as Series 1700 paragraph 14);
- (e) reinforcement (as Series 1700 paragraph 25);
- (f) joints and gaskets including movement joints;
- (g) foundations and bases;
- (h) filling;
- (i) attachment systems and fixings;
- (j) adjustment to flowing alignment;
- (k) fabrication (as Series 1800 paragraph 6);
- (l) protective system (as Series 1900 paragraph 4);
- (m) cast-in sockets, bolts, nuts, washers;
- (n) make-up units;
- (o) dowel bars;
- (p) treatment at lighting columns and the like including cover plates, sub-frames, plates and fixings.

Concrete Safety Barrier Terminations and Transitions

42 The items for concrete safety barrier terminations and transitions shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item Coverage

- (a) concrete safety barriers (as this Series paragraph 41);
- (b) fixing to or setting in concrete;
- (c) fixing to beam safety fences including attachment systems and connectors.

Pedestrian Guardrails and Handrails

- Units** **43** The unit of measurement shall be:
- (i) pedestrian guardrails , handrails..... linear metre.
- Measurement** **44** The measurement of pedestrian guardrails and handrails shall be the developed length along the centre line. The height of pedestrian guardrails shall be the height between the top of the top rail and the finished level of the surface directly beneath the guardrail.
- Itemisation** **45** Separate items shall be provided for pedestrian guardrails and handrails in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Each type of pedestrian guardrail
	2 Each type of handrail
II	1 Different heights
III	1 Elements curved in plan to different radii

Pedestrian Guardrails and Handrails

- Item Coverage** **46** The items for pedestrian guardrails and handrails shall in accordance with the Preambles to Bill of Quantities General Directions include for:
- (a) excavation in any material (as Series 600 paragraphs 17, 18, 19 and 23);
- (b) disposal of material (as Series 600 paragraph 39);
- (c) in situ concrete (as Series 1700 paragraph 4);
- (d) formwork (as Series 1700 paragraph 14);
- (e) reinforcement (as Series 1700 paragraph 25);
- (f) backfilling and compaction;
- (g) metal parapets (as Series 2200 paragraph 5);
- (h) gates (as Series 300 paragraph 6).