

TRANSPORT FOR NSW (TfNSW)

QA SPECIFICATION M232

**INJECTED EXPANDING RESIN SLAB
JACKING / STABILISATION**

NOTICE

This document is a Transport for NSW QA Specification. It has been developed for use with roadworks and bridgeworks contracts let by Transport for NSW or by local councils in NSW. It is not suitable for any other purpose and must not be used for any other purpose or in any other context.

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REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
M238				
Ed 1/Rev 0		First edition.	GM, RNIC	25.05.04
Ed 1/Rev 1	Notes & 1 Foreword	New clause re intended use New Foreword	GM, IC	30.08.07
Ed 1/Rev 2	Most	Format corrected	GM, IC	24.10.07
M232				
Ed 2/Rev 0	All 5.3 Annex A	To match new Maintenance Activities: <ul style="list-style-type: none"> • Changed number • Changed Pay Items • Changed references to other similarly changed specifications Removed Deduction mechanisms Changed internal referencing format Added clause re Accomplishment reporting. Reduced warranty period from 1 year to 6 months,	GM, IC	05.08.08
Ed 3/Rev 0	All	General technical review, and revision of some technical requirements. Format revised.	GM, CPS B Bestwick	20.08.15
Ed 3/Rev 1	Global	References to “Roads and Maritime Services” or “RMS” changed to “Transport for NSW” or “TfNSW” respectively.	DCS	22.06.20

GUIDE NOTES

(Not Part of Contract Document)

THESE NOTES ARE NOT PART OF THE SPECIFICATION, CONTRACT OR AGREEMENT.

The following notes are intended to provide guidance to TfNSW personnel on the application of the Specification. They do not form part of the Specification, Contract, or Agreement.

USING TfNSW M232

This Specification has been specifically developed for TfNSW maintenance works. It must not be used without a review of its suitability for the application and in the contractual environment.

It is a QA specification. The use of QA specifications requires the implementation of a quality system by the service provider which meets the quality system requirements specified in TfNSW Q.

DETAILS OF WORK

Annexure M232/A sets out a generally suitable format for detailing the work required by location and estimated area of slabs to be treated, and type of pavement. Provision is also included for referencing slab maps or sketch plans where considered necessary.

The details provided in Annexure M232/A must be adequate to fully define the scope of work required, including extent and location of voids beneath the pavement slabs and level differences between pavement slabs. This information could include investigation reports, surveys, field inspections, etc.

CUSTOMISING THE SPECIFICATION

In addition to scheduling work details, ensure that a warranty period is defined, and that a field trial is specified where that is considered necessary.

The technical treatment details should be examined in depth before issuing the Specification. Any changes considered warranted by local circumstances should be dealt with by amending the Specification.

INJECTION OF RESIN

The process involves the injection of a resin into soils/subgrades beneath the concrete base pavement (and lean-mix concrete subbase if present). Following a reaction between the chemical components of the resin, it expands and the increased volume compresses the surrounding soil mass and thus increases the bearing capacity of the soil. Depending on the amount and location of resin injected, this process stabilises the concrete base pavement slab and may also result in the concrete base pavement slab being lifted to a predetermined level.

GEOTECHNICAL INVESTIGATION

It is recommended that a thorough geotechnical investigation of the proposed work location is conducted before letting a contract so that the work to be performed can be adequately specified to achieve the required results.

Subgrades that consist of poor or saturated materials may have insufficient bearing capacity. One method of assessing the bearing capacity is to undertake Dynamic Cone Penetrometer (DCP) Testing in accordance with Test Method T161. This can be done by boring a hole through the concrete base pavement slab (and lean-mix concrete subbase if present). It is recommended that any DCP testing be

done as part of the geotechnical investigation for the works. The DCP testing (or any other geotechnical testing) is not included as a requirement in this Specification.

LAYOUT OF DRILL HOLES

Drill holes would usually be in a staggered pattern at nominal 0.9 to 1.5 m spacing. The contractor is required to prepare and submit a layout plan of the drilling pattern as part of the PQP.

FIELD TRIAL

A field trial is generally required for any new supplier of this service.

The decision to waive a field trial would only be made where the supplier of the service has successfully undertaken the work in similar and recent situations for TfNSW.

SLAB THICKNESS AND VOID DEPTH

The measured concrete base slab thickness should make allowance for any spalling at the bottom of the slab caused by the drilling process. The data is being collected for the purpose of improving the understanding of the range of voids that occur and establish the thickness of the existing concrete layer/s.

VOID LOCATIONS

Voids may occur below the concrete pavement base slab or lean-mix concrete subbase (if present).

Where the voids being treated occur under the lean-mix concrete subbase, the process must include a method such as placing a tube into the drill hole to ensure that the expanded resin does not escape and become deposited between the base and lean-mix concrete subbase.



Transport
for NSW

QA SPECIFICATION M232

INJECTED EXPANDING RESIN SLAB JACKING / STABILISATION

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IC-QA-M232

VERSION FOR: DATE:

CONTENTS

CLAUSE	PAGE
FOREWORD	ii
TfNSW Copyright and Use of this Document	ii
Revisions to Previous Version	ii
Project Specific Changes	ii
1 GENERAL	1
1.1 Intended Use	1
1.2 Scope	1
1.3 Structure of the Specification	1
1.4 Definitions	2
2 FIELD TRIAL	3
2.1 Trial Work	3
2.2 Finished Levels of Work	4
3 MATERIALS	4
3.1 General	4
3.2 Injected Expanding Resin	4
3.3 Alternative Materials	4
3.4 Performance Requirements	4
3.5 Additional Material Requirements	4
3.6 Nominated Mix	5
4 EXECUTION	5
4.1 Drilling of Resin Injection Holes	5
4.2 Injection Process	6
4.3 Completion of Work	7
4.4 Daily Work Record	8
5 CONFORMITY	8
5.1 Certification of Conformity	8
5.2 Warranty	9
5.3 Accomplishment Reporting	9
ANNEXURE M232/A – DETAILS OF WORK	10
ANNEXURE M232/B – MEASUREMENT AND PAYMENT	11
B1 General	11
B2 Schedule of Pay Items	12
ANNEXURE M232/C – SCHEDULES OF HOLD POINTS, WITNESS POINTS AND IDENTIFIED RECORDS	13
C1 Schedule of Hold Points and Witness Points	13
C2 Schedule of Identified Records	13
ANNEXURE M232/D – PLANNING DOCUMENTS	14
D1 Construction Processes	14
ANNEXURE M232/E – RESIN INJECTION HOLES LOCATIONS	15
E1 Jointed Reinforced Concrete Pavement (JRCP)	15

E2	Plain Concrete Pavement (PCP) and Steel Fibre Reinforced Concrete Pavement (SFCP)	15
	ANNEXURES M232/F TO M232/L – (NOT USED)	16
	ANNEXURE M232/M – REFERENCED DOCUMENTS.....	16
	LAST PAGE OF THIS DOCUMENT IS	16

FOREWORD

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REVISIONS TO PREVIOUS VERSION

This document has been revised from Specification TfNSW M232 Edition 3 Revision 0.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

PROJECT SPECIFIC CHANGES

Any project specific changes have been indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

TfNSW QA SPECIFICATION M232

INJECTED EXPANDING RESIN SLAB JACKING / STABILISATION

1 GENERAL

1.1 INTENDED USE

This Specification has been developed specifically for TfNSW maintenance works. It must not be used in any type of contract without consideration of its suitability in the prevailing circumstances.

1.2 SCOPE

The work to be executed under this Specification is the injection of expanding resin under Base Concrete pavements for the purpose of Slab Jacking and/or Slab Stabilisation of plain concrete pavement (PCP), steel fibre reinforced concrete pavement (SFPCP), or jointed reinforced concrete pavement (JRCP).

The expanding resin must be injected into the soil beneath the Base Concrete such that the resulting foam:

- (i) Does not make contact with the Base Concrete.
- (ii) Does not make contact with the Subbase Concrete (where present).
- (iii) Is not deposited between the Base Concrete and the Subbase Concrete (where present).

1.3 STRUCTURE OF THE SPECIFICATION

This Specification includes a series of annexures that detail additional requirements.

1.3.1 Details of Work

Details of work to be carried out under this Specification are described in Annexure M232/A.

1.3.2 Measurement and Payment

Payment for the activities associated with completing the work detailed under this Specification must be made using the Pay Item(s) referred to in Annexure M232/B.

1.3.3 Schedules of HOLD POINTS, WITNESS POINTS and Identified Records

The schedules in Annexure M232/C list the **HOLD POINTS** and **WITNESS POINTS** that must be observed. Refer to Specification TfNSW Q for the definitions of **HOLD POINTS** and **WITNESS POINTS**.

The records listed in Annexure M232/C are **Identified Records** for the purposes of TfNSW Q Annexure Q/E.

1.3.4 Planning Documents

The PROJECT QUALITY PLAN must include each of the documents and requirements listed in Annexure M232/D and must be implemented.

If the Contract does not require you to implement a PROJECT QUALITY PLAN, the documents listed in Annexure M232/D must be submitted to the Principal for consideration at least 5 working days prior to work commencing and must be implemented.

In all cases where this Specification refers to the Manufacturer's recommendations, these must be included in the PROJECT QUALITY PLAN.

1.3.5 Referenced Documents

Unless specified otherwise, the applicable issue of a referenced document, other than a TfNSW Specification, is the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 2350). For convenience, the full titles are given in Annexure M232/M.

1.4 DEFINITIONS

The terms "you" and "your" mean "the Contractor" and "the Contractor's" respectively.

The following definitions apply to this Specification:

Base Concrete	The upper (structural) layer of concrete pavement slab with varying insitu strengths typically from 25 to 60 MPa. The concrete pavement slab may contain various forms of steel reinforcement, dowels, and tiebars.
Crack	An irregular, unplanned opening in Base Concrete which is essentially vertical and of various widths, orientated longitudinally (that is, in the direction of traffic), or transversely or a combination. The crack may be straight or meandering and may have arris spalling.
Field Trial	A trial section of injected engineered expanding resin that includes the nominated materials, equipment, and construction methods to be used in executing the works under this Specification.
Fixed Surface	A surface that has a level that is unaltered by the work. Fixed surfaces include most structures and the existing pavement adjacent to the work.
Design Surface	A surface level that is set before the work commences and may not match the existing surface levels on the site. The design surface would be used where the levels are to be changed by Slab Jacking e.g. when the process is being used to lift sunken or punched down slabs to new design levels.
Nominated Mix	The expanding resin proposed by you for use in the works. Since this may be a proprietary material, it is defined by the submission of a sample before commencement of work, together with test results indicating conformity with the requirements of this Specification.

Slab Jacking	A process to raise, lift, or elevate a Base Concrete slab by injecting engineered expanding resin at some depth beneath the slab.
Slab Rocking	A slab condition where the Base Concrete slab edges move vertically when loaded by a heavy vehicle.
Slab Stabilisation / Stabilise	A process that fills voids with injected engineered expanding resin without raising the Base Concrete slab. This can be used to eliminate Slab Rocking or to fill known voids.
Subbase Concrete	A lean-mix concrete layer below the Base Concrete. It may be separated from the Base Concrete by an interlayer treatment such as asphalt or a bitumen sprayed seal. The insitu strength can increase significantly with age, typically range from 7 MPa at 28 days to around 30 MPa at ages beyond five years.

2 FIELD TRIAL

2.1 TRIAL WORK

Where specified in Annexure M232/A, carry out a Field Trial of the expanding resin injection procedure and provide performance data on the outcome in accordance with the requirements of Clause 5.

The Field Trial procedure must comprise one day's production.

The Principal may direct an additional Field Trial when there is any change in materials or operating methods.

Every Field Trial that meets the requirements of this Specification becomes part of the permanent work.

WITNESS POINT

Process Witnessed: Field Trial work (when specified in Annexure M232/A).

Submission Details: Provide at least two Business Days notice of commencement and full details of the extent and location of the Field Trial work.

HOLD POINT

Process Held: Continuation of work following the Field Trial.

Submission Details: Provide conformity data in respect of the requirements set out in Clause 5 for the completed Field Trial work at least two Business Days before proposed commencement of work.

Release of Hold Point: The Principal will consider the submitted documents and may inspect the Field Trial before authorising the release of the Hold Point.

2.2 FINISHED LEVELS OF WORK

The process must raise the Base Concrete slab to match the surrounding Fixed Surface levels or Design Surface levels where required under the scope of work specified in Annexure M232/A.

3 MATERIALS

3.1 GENERAL

Include details of all materials to be used in the PROJECT QUALITY PLAN.

3.2 INJECTED EXPANDING RESIN

The injected expanding resin must be formed from a formulated polyol and an isocyanate.

Upon expansion, the mixed resin must generate an expansive force sufficient to force the foam into any voids and to stabilise and raise the Base Concrete slab to the required level in a controlled manner without causing damage to the slab and to provide sufficient, uniform, and durable support to it.

The components of the resin must be free of CFC and must react immediately when mixed to form a rigid foam insitu with a closed cellular structure.

3.3 ALTERNATIVE MATERIALS

Details of alternative materials for resin injection may be submitted for acceptance by the Principal but these must be supported by documented evidence of long-term acceptable performance in similar situations.

3.4 PERFORMANCE REQUIREMENTS

The minimum compressive strength of the rigid foam is 0.5 MPa when tested in accordance with AS 2498.3.

The rigid foam must reach 90% of this compressive strength within 30 minutes of injection of the resin.

The minimum Tensile Flexural Strength of the rigid foam is 0.7 MPa when tested in accordance with AS 2498.4.

The set foam must not break down under insitu temperature conditions or be adversely affected by insitu moisture.

The maximum elongation allowable for the rigid foam is 6.0% when tested in accordance with AS 2498.6.

3.5 ADDITIONAL MATERIAL REQUIREMENTS

In addition to the requirements of Clause 3.4, the rigid foam must:

- (i) Be specifically designed and formulated for use in pavement structures.

- (ii) Have an established history of use within a pavement structure for the service life of the pavement.
- (iii) Be resistant to chemical, fungal, and bacterial attack.
- (iv) Not pollute groundwater or leach into the environment.

3.6 NOMINATED MIX

Include in the PROJECT QUALITY PLAN details of the proposed Nominated Mix, together with test results demonstrating compliance with this Specification.

Obtain Principal's approval of the Nominated Mix before commencement of any work under this Specification. Any change to the Nominated Mix will result in a further Hold Point.

HOLD POINT

Process Held: Commencement of work.

Submission Details: Provide details of the Nominated Mix and the test results at least five Business Days before proposed commencement of the works.

Release of Hold Point: The Principal will consider the submitted documents before authorising the release of the Hold Point.

HOLD POINT

Process Held: Continuation of work following change to Nominated Mix.

Submission Details: Provide details of any change to the Nominated Mix and the test results at least five Business Days before proposed continuation of the works.

Release of Hold Point: The Principal will consider the submitted documents before authorising the release of the Hold Point.

4 EXECUTION

4.1 DRILLING OF RESIN INJECTION HOLES

4.1.1 Location and Pattern of Holes

Determine and set out the location of resin injection holes to perform the work in accordance with this Specification and the constraints detailed in Annexure M232/E for the pavement type specified in Annexure M232/A. Re-drilling of injection holes that are present from previous injection work is permitted.

The pattern of resin injection holes must ensure that vertical and horizontal filling of voids is achieved and that the resulting foam provides sufficient, uniform, and durable support under the Base Concrete slab especially at slab corners.

4.1.2 Size of Holes

Resin injection holes must not exceed 20 mm in diameter.

4.1.3 Drilling

Drill with care to prevent Cracking or breaking of Base Concrete slabs. Repair any new Crack that extends through a resin injection drill hole by an approved method at no additional cost to the Principal.

No additional payments will be made for any adverse affect on drilling rates because of steel reinforcement that may be encountered.

4.1.4 Inspection of Holes

Inspect each hole after drilling to assess the extent of voids beneath the Base Concrete slab and Subbase Concrete. Keep records of Base Concrete and Subbase Concrete slab thickness and void depth for each drill hole.

4.2 INJECTION PROCESS

4.2.1 Simultaneous Use of Two or More Holes

Where necessary, inject expanding resin simultaneously through two or more holes to reduce the likelihood of Base Concrete slab Cracking.

4.2.2 Injection Beneath Subbase

In the case where resin must be injected beneath Subbase Concrete, insert a tube into the resin injection hole that passes completely through the Base Concrete and the Subbase Concrete to ensure that no resin is deposited between the Subbase Concrete and Base Concrete. Remove the tube after the resin injection process is completed and before the work is opened to traffic. Refer to Clause 4.3.1 for further requirements for removal of the tube.

4.2.3 Commencement of Injection

During injection seal potential resin/foam escape routes such as free edges and other areas where the void is exposed. Where the full Base Concrete slab is not accessible for one injection operation due to traffic or other factors, commence the injection at the furthest point from the traffic load to reduce the risk of Base Concrete slab Cracking. Ensure that Base Concrete slabs are not exposed to traffic when they are partially supported during injection.

4.2.4 Additional Injection

The injection process may need to be undertaken in more than one stage by re-drilling the injection holes or drilling additional injection holes and undertaking additional injection so as to fill the voids and achieve the required Base Concrete stabilisation and/or lift as applicable.

4.2.5 Control of Injection

Use skilled and experienced operators to control the rate of resin injection and the rise of the Base Concrete slab.

Control the lift of the Base Concrete slab so as to meet the specified lift and tolerances. The final levels of the Base Concrete slab must match the surrounding Fixed Surface levels unless otherwise specified in Annexure M232/A.

Do not use hydraulic pressure to lift the Base Concrete slabs.

4.2.6 Monitoring Slab Levels

Monitor the levels of the Base Concrete slab to be stabilised or lifted and the slabs adjacent to it during injection to achieve the required levels without excessive lifting or unwanted lifting of adjacent Base Concrete slabs. You must:

- (i) Use dial gauges on the perimeter of the Base Concrete slab where it abuts other Base Concrete slabs, bridges, and fixtures to monitor and prevent unwanted lifting.
- (ii) Use taught stringlines or levels to monitor the height and lift of the Base Concrete slabs.
- (iii) Record all initial surface level readings before injection commences.

Where matching of levels cannot be achieved without damage to the Base Concrete slab or the surrounding Base Concrete slabs, or if any of the surrounding Base Concrete slabs moves, stop Slab Jacking immediately and advise the Principal within 24 hours.

4.2.7 Control of Leakage

During the resin injection closely monitor adjacent bridge abutments, surrounding Base Concrete slabs, drainage structures and utility ducts for any leakage of expanding resin or foam. If any leaks are detected, stop injection until they are sealed.

Prevent at all times emissions and discharges of injected resin or foam into the environment, or onto persons, vehicles, or other property.

4.3 COMPLETION OF WORK

4.3.1 Removal of Injection Tubing

At the completion of the resin injection, extract any tubing where used. Drill out any tubing which cannot be extracted to a level at least 15 mm below the surface of the Base Concrete slab.

4.3.2 Filling of Injection Holes

At the completion of the resin injection, fill injection holes to the level of the road surface. Remove any excess material from above the injection holes and any other exposed surfaces.

4.3.3 Cleaning Up

Remove from site all drilling debris and all other wastes from operations and dispose of in accordance with Specification TfNSW G36.

4.3.4 Protection of Work

Apart from construction equipment, do not allow Base Concrete slabs to be trafficked until the foam has hardened sufficiently to support traffic loads as confirmed by inspection and testing of the foam in the injection holes.

4.3.5 Inspection for New Cracks

Inspect the Base Concrete slabs for the occurrence of any new Cracks after the completed work is opened to traffic. The occurrence of new Cracks in the Base Concrete is a nonconformity. Remove and replace the Base Concrete in accordance with Specification TfNSW M258 at no additional cost to the Principal.

4.4 DAILY WORK RECORD

Inspect the Base Concrete slabs at the end of each shift by counting and recording the areas of completed Base Concrete slabs Jacked and/or Stabilised, number of holes drilled, and volume of resin consumed. Include in this daily work record start and finish chainages. Sign the record to use as the basis for measurement and payment.

5 CONFORMITY**5.1 CERTIFICATION OF CONFORMITY**

Submit a conformity summary report for all work done and provide any necessary supporting documentation. This report will certify conformity of all work and materials with the requirements of this Specification.

The following activities must be included in the conformity summary.

Activity	Reference	Conformity
Material conformity	Clause 3	Test results of all component materials used in the work.
Drilling of injection holes	Clause 4.1	Certification of conformity.
Injection process	Clause 4.2	When the injection process is complete, the voids must be completely filled.
Completion of work	Clause 4.3	The following tolerances must be achieved: (i) Final Base Concrete slab levels must be within +/- 5 mm of required level. (ii) Where filling of voids only is required, there has been no change to existing Base Concrete slab levels. (iii) No stepping greater than 3 mm across existing joints after the resin injection process.
Completed work opened to traffic	Clause 4.3	No new Cracks in the Base Concrete slab after the completed work is opened to traffic.
Nonconformities	TfNSW Q	List of NCR's issued and dispositions.

5.2 WARRANTY

You must warrant the work for the period set out in Annexure M232/A. The Principal will inspect the work at the end of that period. Any noticeable Base Concrete movement must be re-injected to achieve the requirements of this Specification at Your cost within a one month period.

Any new Cracking in the Base Concrete must be repaired in accordance with Clause 4.3.5 at Your cost within a one month period.

5.3 ACCOMPLISHMENT REPORTING

The accomplishment of conforming work must be reported as specified in Table M232.1.

Table M232.1 – Accomplishment reporting

Code	Description	Unit of Measure	Accomplishment Reporting
232	Injected expanding resin slab jacking / stabilisation	m ²	Report area of Base Concrete slabs treated.

ANNEXURE M232/A – DETAILS OF WORK

Road No.	C/Way	Lane	Segment or Link	Chainage		Area (m ²)	Pavement Type	Jack / Stabilise	Fixed Surface / Design Surface
				From	To				

Details of extent and location of voids beneath the Base Concrete pavement slabs:

Details of level differences between Base Concrete pavement slabs:

Slab maps/sketch plans attached:	YES / NO	("Yes" unless specified otherwise)
Design Surface levels attached:	YES / NO	("Yes" unless specified otherwise)
Field Trial required:	YES / NO	("Yes" unless specified otherwise)
Warranty Period:		(6 months unless specified otherwise)

ANNEXURE M232/B – MEASUREMENT AND PAYMENT

B1 GENERAL

B1.1 Pay Items

Pay items are identified in Annexure M232/B2.

B1.2 Prices

The price(s) of pay items with a quantity of work in the schedule must be costed with due allowance for all costs of the activity.

Any pay item with a quantity of work that is not priced is understood to be included in other priced pay items.

B1.3 Overheads

Any overheads must be distributed between pay items.

B1.4 No Lump Sum

Pay items with a quantity of work specified must not be tendered as a lump sum price.

B1.5 Trial Procedures

Payment must be made for any trial sections which form part of the work detailed in Annexure M232/A and which conform to this Specification.

B1.6 No Payment

You will not be paid for any rework required to achieve conformity with this Specification.

B2 SCHEDULE OF PAY ITEMS

Pay Item*	Item Name and Description	Units
	Note: The work includes all activities, equipment and materials associated with stabilising and jacking Base Concrete slabs.	
M232P1	Slab stabilisation / jacking - injected expanding resin	
M232P1.1	Resin injection holes	Each
M232P1.2	Volume of resin injected	Litres
M232P2	Establishment – Slab stabilisation / jacking - injected expanded resin	Each
	Notes:	
	(i) Establishment is paid once per shift.	
	(ii) It is taken that you have included all the following in tendering your establishment rate - no further payment will be made for them:	
	(a) Plant float to/from the site or project;	
	(b) Set up and removal of site facilities (e.g.: office, sheds, toilets); Principal's facilities (if required),	
	(c) Initial travel to site or project;	
	(d) Daily travel to/from site or project;	
	(e) Accommodation (e.g.: on site or motel/hotel).	
* Pay Items are primarily for guidance in preparing Work Orders (which must be Schedule of Rates). When preparing a Work Order, any or all of the Pay Items may be incorporated: the aim is to improve the accuracy of the Service Provider's estimation and pricing by:		
(a) selecting those Pay Items which denote the activities that are to be undertaken;		
(b) requiring the Service Provider to estimate and price each Pay Item individually.		
When Establishment is a significant cost, the Pay Item specific to it must be incorporated in the Work Order – the cost must not be amortised / absorbed across the other Pay Items.		
Similarly, when Traffic Control is a significant cost, its Pay Item(s) must be incorporated. See Specification TfNSW G10 for a list of these.		

ANNEXURE M232/C – SCHEDULES OF HOLD POINTS, WITNESS POINTS AND IDENTIFIED RECORDS

C1 SCHEDULE OF HOLD POINTS AND WITNESS POINTS

Clause	Type	Description
2.1	Witness	Where a field trial is specified, provide two Business Days notice of commencement and details of extent and location of trial work.
2.1	Hold	Provide conformity data for trial work in respect of the requirement set out in Clause 5.
3.6	Hold	Provide details of the Nominated Mix and a summary of test results at least five Business Days before commencement of the works.
3.6	Hold	Provide details of any change to the Nominated Mix and a summary of test results at least five Business Days before continuation of the works.

C2 SCHEDULE OF IDENTIFIED RECORDS

Clause	Description of Identified Record
3.6	Details of Nominated Mix
4.1.1	Drilling Location Plan
4.1.4	Record of Slab Thickness and Void Depth
4.4	Daily Work Record
5.1	Conformity records

ANNEXURE M232/D – PLANNING DOCUMENTS

D1 CONSTRUCTION PROCESSES

Clause	Process	Details
3	Materials	Materials conform to all the requirements set out in Clause 3.
4	Construction method	Details of all equipment to be used and construction methods proposed.
4.1	Drilling of Injection Holes	Compliance with Clause 4.1 and Annexure M232/E.
4.2	Details of Injection Process	Compliance with Clause 4.2.
4.3	Completion of work	Compliance with Clause 4.3.
4.4	Daily Work Record	Record of work.
5 and TfNSW Q	Process Conformity	Provision of Inspection and Test Plan to indicate conformity with the requirements of Clause 5.1.

ANNEXURE M232/E – RESIN INJECTION HOLES LOCATIONS

Refer to Clause 4.1.1

E1 JOINTED REINFORCED CONCRETE PAVEMENT (JRCP)

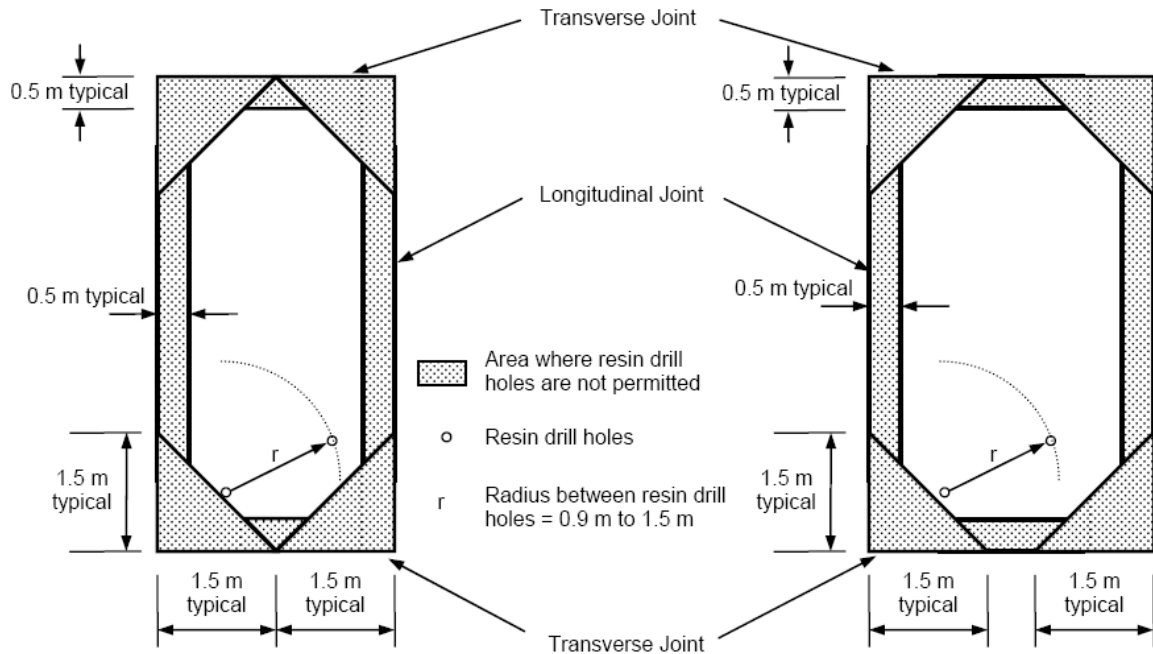


Figure 1 – Slabs up to 3 m wide

Figure 2 – Slabs over 3 m wide

E2 PLAIN CONCRETE PAVEMENT (PCP) AND STEEL FIBRE REINFORCED CONCRETE PAVEMENT (SFCP)

Note that discrete PCP and SFCP slabs may also contain mesh or bar reinforcement.

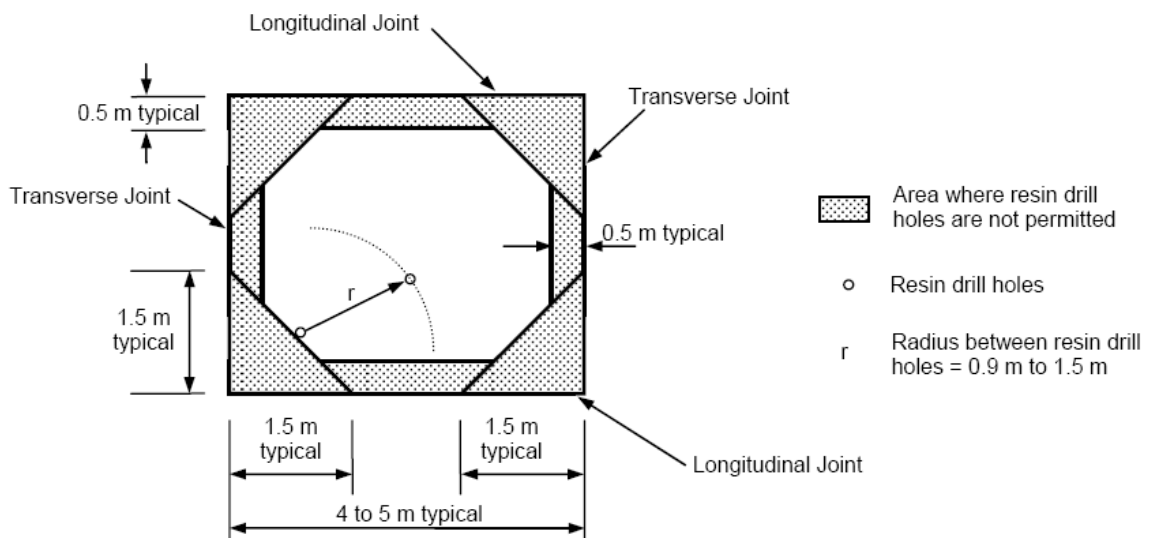


Figure 3 – Typical slab lengths are 4 to 5 m

ANNEXURES M232/F TO M232/L – (NOT USED)

ANNEXURE M232/M – REFERENCED DOCUMENTS

Refer to Clause 1.3.5.

TfNSW Specifications

TfNSW G10	Traffic Management
TfNSW G36	Environmental Protection
TfNSW Q	Quality Management System
TfNSW M258	Slab Replacement (Concrete Pavement)

Australian Standards

AS 2498.3	Methods of testing rigid cellular plastics – Method 3: Determination of compressive stress
AS 2498.4	Methods of testing rigid cellular plastics – Method 4: Determination of cross-breaking strength
AS 2498.6	Methods of testing rigid cellular plastics – Method 6: Determination of dimensional stability