

DOMESTIC CONCRETE DRIVEWAYS

INTRODUCTION

The concrete driveway is now an established feature in the garden setting of many West Australian homes.

It provides a permanent improvement to the home which will give years of maintenance free service if certain simple construction procedures are followed.

A domestic driveway must have sufficient structural strength to withstand the continual traffic of private vehicles and infrequent loading by commercial vehicles.

To give quality performance the construction, materials and detailing must be of specified acceptable standards. However, the quality is not great when the concrete driveway becomes a lasting asset to the home owner with a maintenance free life of many years.

The Specification enclosed lists the requirements for the construction of a domestic concrete driveway. It can be used by the homeowner or the builder in discussion with the granolithic contractor, or as the basis for a contract document. The use of this Specification will ensure the production of high quality domestic concrete driveways.

DIMENSIONS

Driveways may consist of two strips at least 450mm wide or they may be constructed in one piece a minimum of 2400mm wide.

Whenever possible the drive should have a 450mm margin on either side of the car to provide firm footing for alighting where passengers are to be set down.

FOUNDATIONS AND DRAINAGE

Care must be taken to ensure that the site of the driveway is firm and well drained. When water tends to accumulate on the site a sub-surface drain of agriculture pipes should be placed alongside the drive.

Filling shall be clean sand free of deleterious material.

Other materials suitable to use as filling are:

- Well graded gravel
- Ashes (well compacted)
- Clinker
- Crushed rock e.g. road base
- Limestone

GRADIENT OF DRIVEWAY

There are two items to be investigated when planning the gradient of the driveway.

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ITEM 1: *Steepness of Slope for Traffic Use*

If the garage is above or below street level and is located close to the front boundary, then the driveway grade may have to be steep.

Footpath and driveway crossover levels should be obtained from the local council, and by referring to the graph (Fig. 1) the driveway grade can be determined. When the grade is too steep, the owner will find that the car tyres will not grip; he has poor vision when backing out and the underneath parts of the car catch upon the driveway at points of sudden changes of slope. Grades in excess of 12% make the driveway difficult to negotiate. Grades between 12% and a recommended maximum of 24% need a transition as detailed (Fig. 2).

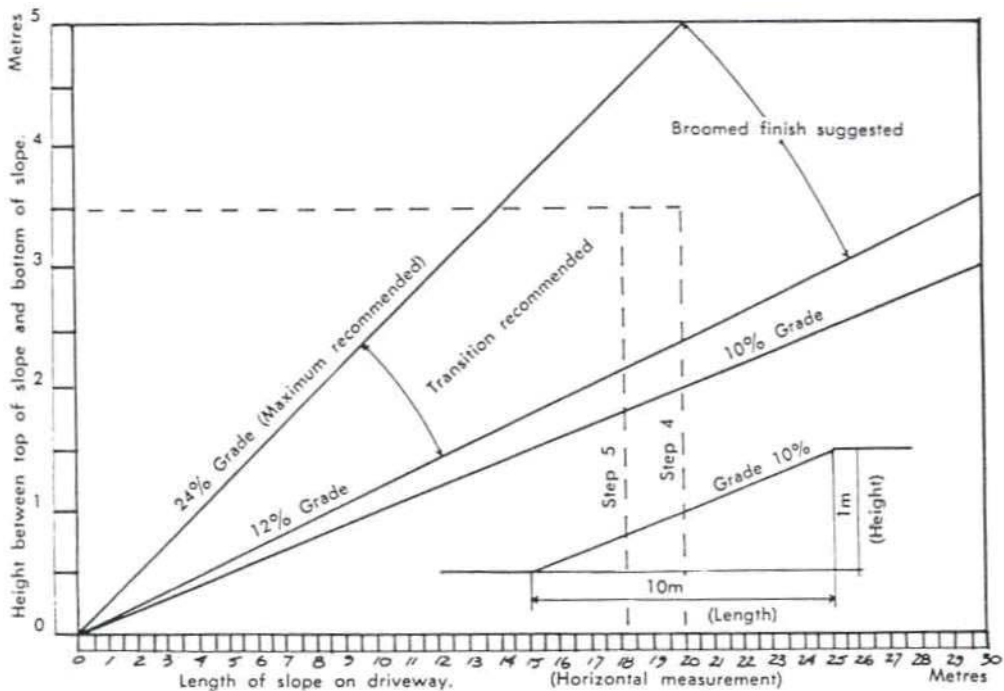


FIGURE 1: Driveway Grade

ITEM 2: *Stability of Driveway*

When the driveway has a reasonably steep gradient (greater than 10% can be critical) then major failure can result due to the concrete pavement sliding down the slope. If it is considered that the possibility of sliding exists, then the addendum to the Specification can be used.

A large block of concrete on the form of a flat paved area, i.e. a concrete crossover, or a concrete key will alleviate the problem. The key can be in the form of an edge thickening to the pavement (Fig. 4).

An alternative and preferred method is to completely reinforce the full length of the driveway.

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As the compaction and drainage of the sub-base can be most critical, then it is important that the contractor strictly adheres to the clauses in the Specification listed under “1.0 Site Preparation”.

To illustrate the determination of a satisfactory driveway gradient, an example is outlined as follows (Fig. 3).

1. The future crossover level and footpath levels are obtained from the local Council.
2. The proposed carport level is determined and the height difference between top of slope and bottom of slope calculated.
3. The length of driveway slope is measured.
4. Knowing the height (3.5m) and the length (20m) then the slope is plotted on the graph.
5. The transition occurs over a total length of 3.6m and to contain the transition within the boundary, the driveway slope length must be reduced by 1.8m and a new slope read from the graph.
6. By measuring 1800mm back from the point of change in grade in both directions, and joining these points with a straight line, the transition slope is determined (Fig. 2).

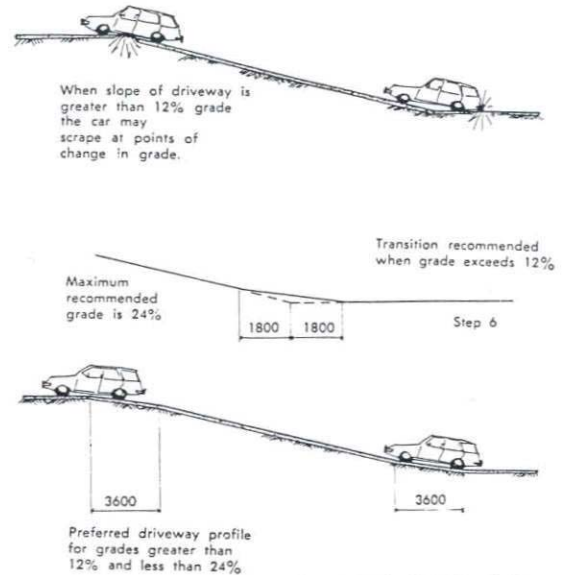


FIGURE 2: Planning your Driveway

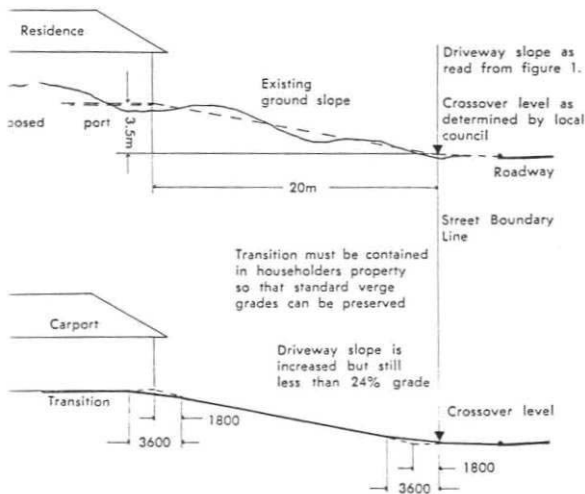


FIGURE 3: Example for Planning Driveway Gradient

The requirements for grade will vary with type of car used; surface finish of concrete and persons using the driveway, but the grades given can be used as a general guide. Ideally, a driveway of similar grade to the proposed driveway should be inspected for suitability.

CONCRETE

Pre-mix concrete provides an efficient, simple and economic method of obtaining the specified

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concrete mix for the job. The pre-mix concrete is made from high quality materials and has a guaranteed strength.

The exact quantity required for the job can be ordered and the concrete will be supplied to the site when and where it is needed, eliminating wastage and unsightly stockpiles of cement and aggregates.

FINISHING CONCRETE

The method of finishing pavement surfaces depends on the degree of smoothness required.

Steel Trowel

Provides a smooth easily cleaned surface. This surface may be slippery when wet.

Wood Float

Provides a slightly roughened non-slip surface.

Broomed Finish

Provides a high skid resistant surface. Recommended for steeply sloping driveways where added traction for vehicles is required.

Pattern Stamping

Involves the use of patented aluminium tools to imprint patterns on freshly placed horizontal concrete surfaces. Various tools have blades in the configurations of brick, tile, cobblestone and other patterns. Bomanite is a trade name for this type of finish.

Exposed Aggregate Finish

Where aggregate is to be exposed the concrete manufacturer supplying concrete to the job and /or the paviour should be advised of the type and colour of finish sought.

The surface should be brushed with a soft broom to remove surplus mortar about an hour after the concrete has been placed.

When the concrete has hardened sufficiently to prevent stones from being dislodged, the surface should be brushed again with a stiff broom and sprayed with water, leaving the stones slightly "proud" of the surface.

Timing for the exposure of aggregate is critical and the householder is ill-advised to attempt this finish on large areas of paving at any one time without assistance of a skilled tradesman.

Coloured Finish

Premixed materials are available for producing monolithic coloured surface treatments.

Preliminary floating should be done before the colour treatment is applied.

The material should be applied uniformly to the concrete surface.

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The material should be applied in two applications the first coat using about two-thirds of the total amount.

The second coat should be applied immediately after the first coat has been floated into the surface.

Both coats should be thoroughly floated and made part of the surface, taking care that uniform colour is obtained.

If a trowel surface is desired, flat trowelling shall immediately follow the final floating.

For premixed materials the preparation, mixing proportions, application procedures and precautions should be performed in strict compliance with manufacturers' recommendations and directions.

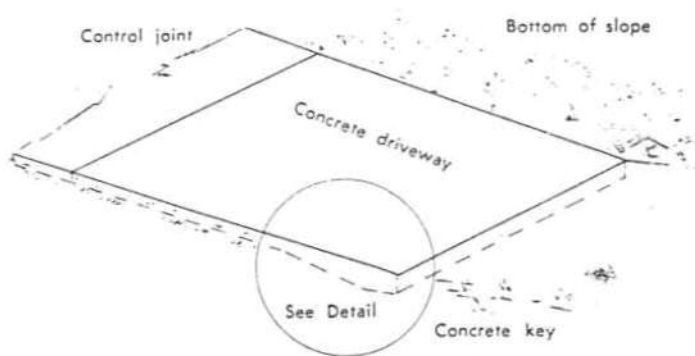


FIGURE 4: Sloping Concrete Driveway with Key

JOINTS

To control surface cracking resulting from the shrinking of concrete in its early life, the driveway should be divided up into sections by control joints.

Control joints are formed by cutting across the concrete with the edge of a steel trowel. The surface of the concrete over these cuts is then grooved with a special grooving tool.

Any cracking that occurs is thus confined to the weakened plane of the joint.

Alternatively shrinkage cracking may be resisted by a layer of light reinforcement mesh.

CURING

Curing is the chemical process during which the internal structure of the concrete is built up to provide strength, resistance to wear, and durability. Incorrect curing can result in cracking and sometimes complete disintegration of the concrete surface. The concrete must be kept damp during the curing period by one of the methods below.

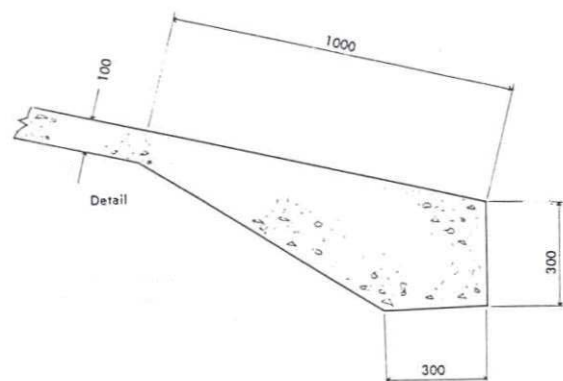


FIGURE 5: Concrete Key

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Suggested methods for curing the concrete are:

- Ponding with water.
- Continually sprinkling with water.
- Polythene sheeting or building paper securely held in contact with the surface of the slab.
- Damp hessian securely held in contact with the surface of the slab.

STREET ACCESS

When planning the driveway it is important that conflict with trees, poles, pits, signs etc. is avoided so that a clear area for access and visibility is maintained with respect to the roadway.

To fully appreciate the features of a concrete driveway system, the crossover which links the street to the boundary of the property should ideally have the same colour and surface texture as the internal driveway.

Because the crossover is normally installed by the Local Government Authority, the householder, in making application for a concrete crossover, should discuss with the Town or City Engineering Department, the type and finish which would suit best.

A concrete driveway system from the road to the house will eliminate maintenance costs and enhance the appearance of the home for many years to come.

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