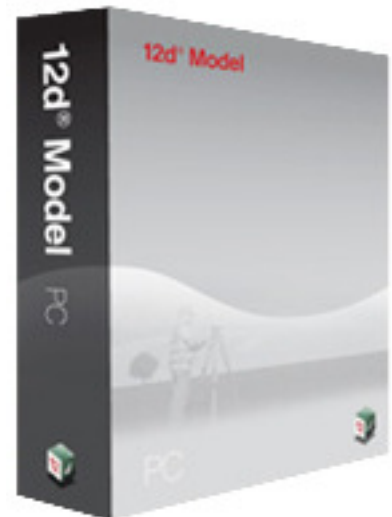




12d[®] Model Training Courses



Queensland

**Power, efficiency, stability.
Explore the possibilities that
12d Model delivers to your civil
surface modelling projects.**

Two Day Introduction to Civil Design Course

Course ID: - 2DIC

Summary

This course introduces people to the use of 12d Model and its concepts for civil work.

Prerequisites:

No experience in 12d Model is necessary but **basic computer skills** are required along with the ability to understand and write in the English language.

Course Content:

- Mouse configuration in 12d; Project start uploading
- Screen Layout - Menus Icons and Views
- Models, Strings and CAD concepts
- Plan, Section and Perspective Views
- Triangulation, breaklines, nulling, contours
- Horizontal and Vertical Alignment creation and editing
- Template Creation, and editing; Apply Function
- Basic Plotting of long and cross sections
- Pad design using alignment string
- Cad applications for creating road features such as roundabouts
- Tutorials used for revision of training
- The completion of this course is required before attending the Intermediate Road Design course

Important Note:

This course is for showing how to use 12d Model when doing civil design work. It **does not** teach civil design principles.

Two Day Intermediate Road Design Course

Course ID: - 2DIRD

Summary

This course follows on from the **Two Day Introduction to Civil Design** course. Understanding of basic road design is essential.

Prerequisites:

Experience in 12d Model with **completion** of the **Two Day Introduction to Civil Design Course** or **One Day Introductory Civil Design** is required.

Course Content:

- Importing different types of survey data using map file, triangulation and analysis
- Alignment creation and editing using Super alignment IP and introduction to Element method
- Road templates, viewing and accessing the design, service interference



- Apply many function, modifiers, boxing
- Intersection design with culdesac
- Volumes of all surfaces including boxing
- Plotting Setout plan, long and cross sections
- Use of Tagging, Introduction to chains

Important Note:

This course is for showing how to use 12d Model when performing **intermediate road design work**. It does not teach civil design principles.

One Day Advanced Civil Design Course

Course ID: - 1DAC

Summary

This course is only for **experienced** 12d Model civil designers.

Prerequisites:

For experienced 12d Model users only. Completion of the **Two Day Intermediate Civil Design** course is essential.

Course Content:

- Super Alignments
- Speed table IP method
- MTF options
- Multiple boxing
- Apply many function Vis mapping, Tin and sight distance, Tadpoles
- Decisional Templates.
- Complex batter treatment
- Fill requirements depending on height
- Forced table drains
- Visualisation
- Surface textures
- Road furniture
- Line marking
- Roundabout using element method and computators
- Chain commands

Important Note:

This course is for showing how to use 12d Model when doing civil design work. It **does not** teach civil design principles.

One Day Advanced Overlay and Widening Course

Course ID: - 1DAOW

Summary

This course takes the user through a **typical overlay** and **widening** civil design project.

The analysis is carried out using **variable depths** and **crossfalls**, **design surface triangulation** and **depth isopach** comparisons.

The project utilises a compilation of overlay and full road reconstruction and their associated **subgrade design requirements**.

Prerequisites:

For **experienced** 12d Model users only. Completion of **Two Day Intermediate Road Design** course and **Advanced Civil Design** course is **essential**.

Course Content:

- Introduction to Overlay Concepts
 - setting up the data required
 - getting familiar with Overlay Panel and terminology
 - looking at outputs such as spreadsheets and plots
- Creating Design Surface
 - by initial analysis of existing surface to locate areas of superelevation, good and substandard crossfalls
 - refining design to optimise balance of materials used, scarification and design standards
- Generating Pavement Design
 - by defining subgrade and intermediate pavement layers
 - applying new techniques to locate critical points for the pavement construction
- Automating Re-work

Two Day Advanced - Interchange Civil Design

Course ID: - 2DAICD

Summary

This course is only for experienced 12d Model civil designers.

Prerequisites:

For experienced 12d Model users only. Completion of the **Two Day Intermediate Road Design Course** and the **One Day Advanced Civil Design Course** is essential.

Course Content:

The course entails a freeway design of an overpass interchange. The interchange consists of exit and entry ramps and two roundabouts. All freeways and off ramps are governed by speed tables.



Design speed tables are used and methods investigated to aid in acceleration and deceleration travelling along the ramps. Custom options are also discussed.

There is extensive use of Super Alignments and computators, especially in relation to the exit and entry ramps, roundabouts and overpass.

Design visualisation is ongoing in the project along with model and tin sharing, raster image import and their role in the use of Super Tins in the design.

The management of Intersecting shoulders, drains and interfaces at the merging of ramps are addressed utilising super alignments and computators.

The use of super alignments as strings in the MTF modifiers is paramount in all designs and is a main feature of the course.

Important Note:

This course is for showing how to use 12d Model when doing civil design work. It does not teach civil design principles.

Stormwater Drainage Course - Part 1

Course ID: - 1DSWP1

Prerequisites:

Experience in 12d Model with completion of the **Two Day Introductory Civil Design Course** or working through the 'Getting Started for Design' Manual is required.

Course Content:

Part 1 of the Stormwater Drainage Course includes the skills required to complete a minor stormwater drainage design including the following:

Network Design

- Trainees will start from creating a super tin to use with the drainage design
- Create (using templates) and edit a 12d drainage string and import designs from CAD
- Use the powerful network editor for pipe invert alignment including detecting and avoiding service clashes
- Link structures to the roadway design for structure alignment and construction levels/setout
- Additional techniques to calculate structure coordinates with grate and cover elevations

Rational Hydrology

- Review default hydrology methods for determining C and tc
- Set multiple catchment areas per inlet structure via direct input and catchment polygons
- Determine time of concentrations from length – slope strings

Hydraulic Grade Line Check

- Parameters for determining energy losses in pipes
- Pit pressure loss Coefficients (K) in 12d Storm analysis
- Culvert design with inlet control calcs
- Size pipes and box culverts

Reporting

- Produce detailed hydrology, hydraulic and construction setout reports
- Produce drainage plan and long section drawings with user defined data, pipes as linestyles and manholes as symbols

Important Note:

This course is for showing how to **use 12d Model** when doing stormwater work. It **does not** teach stormwater and drainage principles.

Stormwater Drainage Course - Part 2

Course ID: - 1DSWP2

Prerequisites:

Experience in 12d Model with completion of the **Stormwater Drainage Course - Part 1** is required.

Course Content:

Part 2 of the stormwater drainage course continues on with the rational based hydrology of part 1. It includes the additional skills for analysing major flood events and customising the user defined database for the drainage module.

Approach, Bypass Flow and Inlet Capacity Calculations

- Flooded width, section capacity and velocity*depth calculations for roadway and channels
- Alter n values, max flooded width and proportion catchment flows along bypass flow paths
- Analyse flooded areas resulting from ponding at SAG pits
- Bypass flow with detailed inlet capacity for SAG and ongrade inlets
- Surcharging flows during major flow event analysis

Network Quantities and Reporting

- Customise pipe and pit quantity reports by type and depths



- Use 12d templates to calculate trench volumes
- Import/export to spreadsheets
- Customise pit schedule reports through spreadsheet interfaces
- Customised drainage long sections with hatching under roads and adding of user defined data
- Customised plan drawings with user defined pit symbols and data
- Bring your own inlet capacity curves, pit symbols, reports, long sections or plan drawings that you want to customise in 12d (otherwise we will use our examples at this training session)

Important Note:

This course is for showing how to **use 12d Model** when doing stormwater work. It **does not** teach stormwater and drainage principles.

One Day Dynamic Drainage Basin Design Course

Course ID: - 1DBD

Prerequisites:

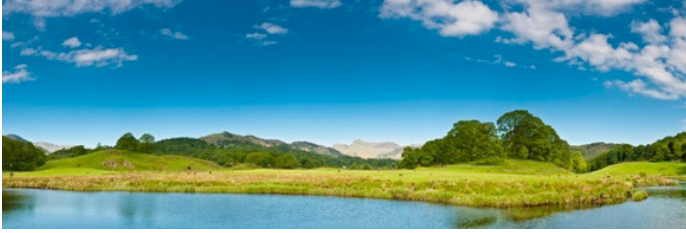
For experienced 12d Users only. You must be fully **familiar** with the **Drainage Network Editor (DNE)** and know how to design drainage networks in 12d.

This “Dynamic Drainage for Modelling Basins” course is a logical extension for 12d drainage users who have already attended the **Stormwater Drainage Course (Parts 1 and 2)** and wish to further extend their Drainage design skills.

The course continues on from the **rational hydrology** method to the **ILSAX** (method 2) hydrology and dynamic flow in pipes.

Course Content:

- Hydrology
 1. Moving from rational "C" to Soil types and antecedent moist conditions (Horton infiltration)
 2. Additions to the 12d rainfall file including Rainfall Temporal Patterns.
 3. Reviewing graphical outputs
- Hydraulics
 1. Modelling diverging flow conditions
 2. Bypass flow using surface flows with section shapes cut from the design tin.
 3. Time series for tail water conditions.



4. Modelling natural channels using section shapes cut from the design tin.

- Detention Basin Design
 1. Estimating storage to meet the pre development discharges,
 2. Creating detention basins and extracting elevation area curves from the tin,
 3. multiple outlets design (combining spillway, control pipe, orifice)

One Day HEC-RAS Interface Training Course

Course ID: - 1DHR

Prerequisites:

Experience in 12d Model with completion of the **Two Day Introduction to Civil Design** Course or working through the 'Getting Started for Design' Manual is required.

12d Model provides an interface with HEC-RAS which allows the creation of a HEC-RAS project from a digital terrain model, and provides powerful tools for presenting the results of the HEC-RAS analysis.

Course Content:

- Identify the river strings required for the HEC RAS project.
- Create and locate cross sections along the river.
- Export the data from 12d Model to HEC-RAS.
- Open the HEC-RAS Project, and analyse the river for a design discharge.
- Use HEC-RAS to interpolate cross sections.
- Export the river water levels and channel shape data from HEC-RAS
- Import the data from HEC-RAS into 12d Model
- Create an inundation map using the water levels from HEC-RAS
- Create plans and cross sections from the HEC-RAS data suitable for use in reports or for tender documentation. This includes multiple water level results and depth contours.
- Create a 'fly down the river' .avi movie file of a rendered 3d perspective view.

Important Note:

This course is for showing how to **use 12d Model** with HEC-RAS. It **does not** teach rivers work principles or how to use HEC-RAS.

One Day Introduction to Survey Course

Course ID: - 1DIS

For members of the SSI Qld Region – **3 CPD Points**
Summary:

This course introduces people to the use of 12d Model and its concepts for surveying work.

Prerequisites:

No experience in 12d Model necessary but basic computer skills required.

Course Content:

- Overview of 12d concepts: File structure, On Line Help, Mouse configuration
- Screen Layout: Pull down menus, Icons, Views Models (Layers), Strings, CAD Concepts
- Importing / Exporting data
- Triangulation and analysis
- The completion of this course or the 'Getting Started for Surveying' manual is required before attending other survey courses

Important Note:

This course is for showing how to use 12d Model when doing surveying work. It does not teach surveying principles.

Two Day Detailed Survey Procedures Course

Course ID: 2DDS

For members of the SSI Qld Region – **6 CPD Points**
Prerequisites:

Experience in 12d Model with completion of the **One Day Introduction to Survey** course or working through the 'Getting Started for Surveying' Manual is required.

Course Content:

- 12d Configuration: Creation of title block, linestyles, Mapping files, Text Styles and User defined icons.
- Traversing: Manual entry and adjustment, least squares network adjustment
- Field techniques: Feature coding, control coding for enhancements including pipes, image attachments and attributes
- Downloading: Trimble Link, Sokkia Link, Leica 1200 GSI and Topcon GTS700 formats
- Field file and manual editing: Dynamic editing of data with full auditing

- Errors in coding, target heights and stringing
- Manual edits: Joining strings, point edits, tinability
- Triangulation: Creation, analysis, Section views, Perspective views, Raster draping
- Plotting: Contours, Text labeling, Grids, Plotter mapping files, ACAD map files,
- Quick plots, Plot frames, Plot to PDF file and AutoCAD.

Important Note:

This course is for showing how to use 12d Model when doing surveying work. It **does not** teach surveying principles.

Two Day Advanced - Design to Field Survey Calculations Course

Course ID: 2DDF

Summary

This course is only for **experienced** 12d Model surveyors.

Prerequisites:

Completion of **Introduction to Survey Course** and relevant experience in Setout for Construction.

Course Content:

- Importing design
- 12d Ascii
- DWG
- Genio
- Analysis and checking
- Code mapping
- String conversions and filtering
- Alignment editing
- Cross section creation
- Volumes
- Boxing templates creation
- Boxing many calculations
- Multi stockpiles
- Progressive volumes
- Isopachs and shading
- Setout
- On grade setout
- String setout
- Setout plot
- Uploading points / string
- Road upload
- Machine control upload
- Intro to 12d Field (integrated field solution from

- 12d)
- Plotting
- Natural surface profiles
- Ascon profiles
- Ascon sections
- Perspective plotting

Important Note:

This course is for showing how to use 12d Model when doing survey calculations. It **does not** teach civil survey principles.

One Day Introduction to 12d Field Setout Course
Course ID: - 1DIFLD

Summary

This course introduces the user to 12d Field Setout through **data preparation and simulated setout**. Understanding of basic Survey setout procedures is essential.

Prerequisites:

Experience in 12d Model with completion of the **One Day Introduction to Survey** course is required.

Course Content:

- Data checking
- Importing design data created by 12d designers
- Checking road centrelines and cross sections
- Creating design tin for finished surface level
- Creating setout points for imported boundary and building strings
- Creating grid lines for column setout
- Using 12d Field
- Discussion of instruments and interfacing
- Basic Settings
- Simulator settings
- Station setup (Standard or Helmert)
- Single string setout
- Batter Setout
- Tin Setout
- Point Setout
- Grid Setout
- Basic file management
- Basic Trouble shooting

Important Note:

This course is for showing how to use 12d Model when performing basic setout. It **does not** teach Survey setout principles.

One Day V10 Design Upgrade Course

Prerequisites:

This is an advanced course and attendees must be experienced 12d users and have an understanding of:

Super alignment methods of construction

Modifiers in general and a grasp of the latest Start and End Modes

- Start and end of ref
- Start and end of other string, *etc.*

Boxing and methods of application

- Apply Many Function
- Boxing Many Function

Course Outline:

1. 1 day V10 Design Upgrade course Super Alignment:

- Design Standards and Design Templates -
 1. Design speeds
 2. Custom superelevation and widening
 3. MTF and Apply Many application
- Named parts and positions
- New solving and Computators
- Validation and reports
- Components -
 1. Exit and Entry Ramps for interchanges
 2. Urban 4 way intersection
 3. Roundabout
 4. CHR intersections
 5. Bus Bays
 6. Culdesacs
- Apply Many Manager
- MTF modifiers
 1. String Parallel
 2. Absolute Widths
 3. Absolute Inserts
 4. Slope intersect....and more
- Boxing -
 1. New Boxing Rules
- Batter Intersect
- Decisions
- Tin Intersect....and more
- New Volume report
- Long plot manager, Paired Cuts
- Timelines introduction

One Day Introduction to 12d Macro Writing Course ID: - 1DMAC

Summary

This course starts people writing, compiling and running 12d Model Macros.

Prerequisites:

Attendees should be familiar with basic 12d Model terms and concepts such as models, tins, strings, panels, picking strings.

No previous programming experience required but a capacity for logical thinking is essential.

Course Content:

The 12d Model programming language (12dPL) is a powerful programming language designed to run from within 12d Model.

Its main purpose is to allow users to enhance the existing 12d Model by writing their own programs (macros).

12dPL is based on a subset of the C++ language with special extensions to allow easy manipulation of 12d Model data. A large number of intrinsic functions are supplied which cover most aspects of civil modelling.

12dPL has been designed to fit in with the ability of 12d Model to "stack" an incomplete operation.

This course covers:

- Using the 12d Model Programming Language manual.
- 12dPL syntax and flow control.
- The basic 12dPL variable types and "handles" to 12d elements (strings, *etc.*).
- How to create, compile and run 12dPL code.
- How to retrieve and change basic element properties.
- Reading and writing files (creating reports).
- Creating 12d Model panels.
- Including your 12dPL programs in the User Defined menus, function keys and toolbars.

Important Note: This training course does not try to teach programming techniques but takes attendees through the basics steps to start writing and running 12d Macros.

One Day 12d Model Customisation Course—1DCUST

Summary

The customisation course is designed to cover as much of the 12d session set-up as possible in one day, so the defaults, setups, workspace, line-styles symbols, text styles, names - how names flow through to plotting, etc.

Having these set up throughout the company can save a lot time and money if everyone is set up the same.



RMS Customisation