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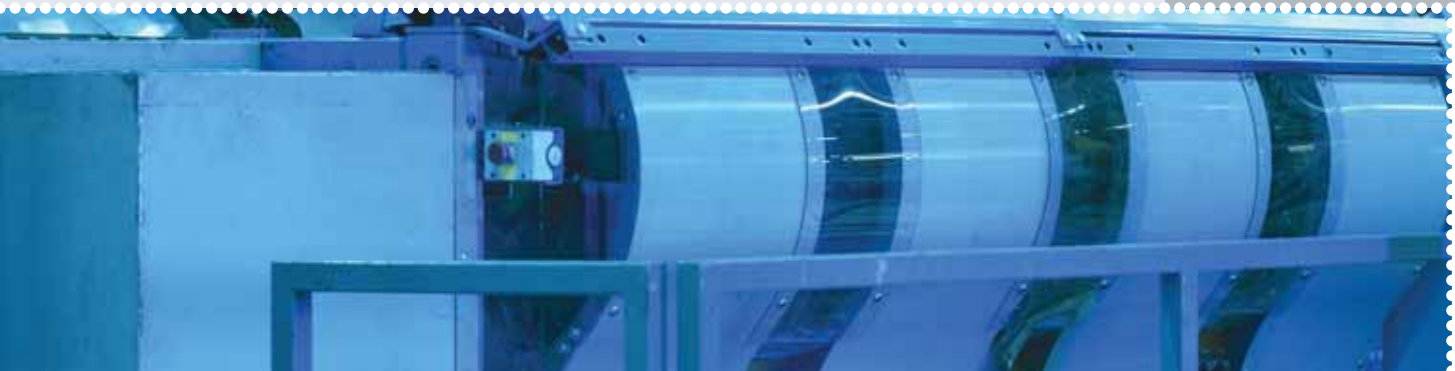
TRiCAD ES

Digital Factory Design



The universally designed 3D solution for digital factory design.

TRICAD MS®

Digital Factory Design	Building Services Engineering	Plant Design	Traffic Design
• Conveyor Systems	• Building Module	• P&ID	• Light-rail envelope curves
• Steel Platforms/Steel Construction	• Heating/Coldness	• 3D Piping	• Road vehicle envelope curves
• Paint & Coating Systems	• Ventilation	• Pipe Categories	• Layout module
• Tractory Curves	• Sanitary	• Isometric Drawing (Iso X)	
• Crane Units	• Electric	• Structural Steelwork	
• Swarf Conveyors	• Sprinklers		
• Layout Module	• Schematic/Infrastructure		
• Fire Protection Layout	• Fire Protection Layout		

Database (vDB) Quality Check Report Manager Clash Detection Construction Modelling Viewer

Contents

Unique, simple and effective.

VenturisIT Building Information Modelling (BIM) provides you with the complete set of tools for the software-aided design, implementation and management of buildings.

Using this unique variety of design modules, you combine and network all the relevant building data in one three-dimensional virtual model. TRICAD MS® – the leading industry solution for digital factory design, building services engineering and plant design – has been optimising the intelligent management of data for more than ten years. This enables you to save time in the realisation of your ideas using a single environment. The main advantage: Even with complex projects your designers do not need to work with different tools. Instead, they always remain in the familiar, trusted environment. This means that you can cover all aspects of construction even with a smaller project team and share the data with your designer engineers.

Identical handling in all aspects of construction.
The principle of operation with TRICAD MS® is almost identical in each module. Not only that, the data are available throughout, i.e. they only need to be entered once. In this way you significantly reduce your time and labour outlay. Also important are the integral computation features. These include the sewer system and pipe network, waste water and radiators through to the VdS sprinkler calculation using IDAT. The advantages of the universal, networked TRICAD MS® design package are plain to see: With several licenses in the company you effortlessly establish a standardised environment for all modules. With the aid of this standard your design engineers can work together following the same "Environment" (env) guideline.

Easy familiarisation and a fast learning curve.
The introduction of TRICAD MS® increases your productivity. Due to the simple structure, you can be working productively with the software within a few days. Each module is structured in the same way. A data base is not essential since all information is contained in the DGN file. For example, the TRICAD MS® 3D model depicts the complete building or the whole factory. Our ground-breaking software solution also secures your investment in training and building data, providing direct competitive advantages through high versatility.

The main advantages at a glance:
- Universal process from design through to installation
- Fast implementation of changes in the 3D model
- Different views or mass assessments at the press of a key
- Extensive exclusion of clashes by the designers

Conveyor Systems

With this layout module in TRICAD MS® you have a user-friendly tool available for the partially automated design of overhead and floor-based materials-handling systems. Position the relevant conveyor elements easily using an appropriate configuration mask. Here you can work as desired with almost twenty different types of conveyor. We have integrated the following materials-handling systems in co-operation with leading factory designers.

Overhead conveyor systems

- Power & Free
- Electrical overhead monorail (single and double strand)
- Electrical inverted monorail
- Circular conveyor
- Overhead cable conveyor
- RoDip and VarioShuttle

Floor conveyor systems

- Roller conveyor (single and double strand)
- Skid roller conveyor
- Plate conveyor (single and double strand)
- Belt conveyor (single and double strand)
- Carrying chain conveyor
- Skillet conveyor
- Electrical pallet conveyor
- Electric floor conveyor
- In-floor conveyor
- AGVs

Position a roller conveyor in a trice by defining the start and end points. It is also just as easy to position tables, lifters, points, etc. With the roller conveyor you have for example the following input parameters available for one strand:

- Width of the roller conveyor
- Roller width
- Respective distance to the cheek
- Roller spacing at the start and end, and with respect to one another
- Roller thickness
- Height to top of rollers
- Effective height
- Spacing of roller conveyors to one another
- Gradient of the individual roller conveyor

This wide range of variants enables you to realise individual designs. You can also position control cabinets, guard barriers and loading gantries as required around the conveyor elements using the materials-handling layout module. You produce the guard barriers very simply by clicking on a line in the 3D mode. Insert the doors and apertures at any time later. Apply a bottom guard along the overhead conveyor system by placing it, for example, through the selection of a planned electrical overhead monorail or by placing it along an existing line. You can specify the bottom guard in height, width (left/right), spacing and model.

An initial envelope-curve analysis is already integrated into the module. You can carry out other detailed analyses with the tractory curve module. Finally, with this tool you can also assign unit prices (mechanical or electrical) for the used components or track mass assessments via the report manager and Microsoft Excel. Optionally, you can transfer your data to the simulation software via the XML interface.

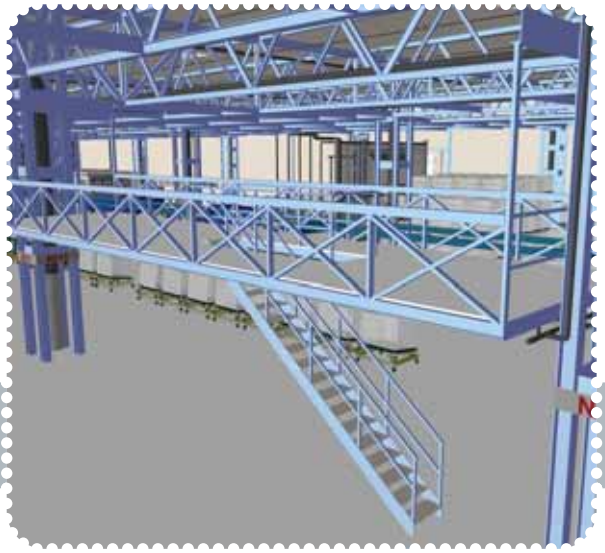
Steel Platforms/Steel Construction

With the combined steel platform and steel construction module in TRICAD MS® you can easily produce routine layouts in both the 2D and 3D models. You can access the associated reporting and dimensioning for all components. All currently available DIN profiles are stored as well as further country-specific steel profiles. Design your steel beams in any MicroStation window directly in the 2D or 3D view. Construct platforms, surfaces and apertures according to freely definable polygons.

TRICAD MS® also enables you to automatically surround apertures with 3D steel beams. Here, the intersection priority with the bearers and apertures is taken into account. Furthermore, you have the option of defining and modifying different profile ends as required during the design, such as for example, end plates, mitred joints or welding gaps. You have the choice of applying detailed grid or metal sheet floors or simple overlays.

Here is a summary of the other functions:

- Semi-automatic design of the railing with specification of the handrail, knee strip, side guard, base board and post profile.
- Positioning of parametric steel stairways with the setting of limits for the step measurements, comfort and safety.
- Implementation of the steps in metal sheet or tread-plate.
- System check of these limits during stairway design.
- Easy creation and flexible modification of ladders with display, appropriate to the profile, of main dimensions, rung spacing, wall mounting, back safety guard and entrance funnel.
- "Free form" input of user-defined steel designs in space with variable handling of the degree of detail in the graphical representation.
- Transfer of the completed layout model via the SDNF interface to production-orientated steel construction programs, such as "bocad".
- Component selection using a sample data base with over 100 stairways, more than 25 ladders and 10 different railing variants.



Paint & Coating Systems

With the TRICAD MS® Paint & Coating Systems you have the possibility of generating complete layouts for the design of spraying and drying plants. The required components to be fitted are available either fully parametrised or are present in an application-specific cell library. The alignment and location of components, e.g. spray nozzles, can be individually defined in relation to the selected booth.

The definition of the component parameters is simplified through the integration of predefined sample data sets for spray booths and other objects. You can quickly select the booth via the respective process step and place it with the aid of two points as with a line. Here, properties such as colour, level and line thickness, etc. are immediately assigned. All the booth properties can be processed retrospectively at any time using the Info button. When you select the Info button and click the relevant booth, you are shown the same mask as for the input.

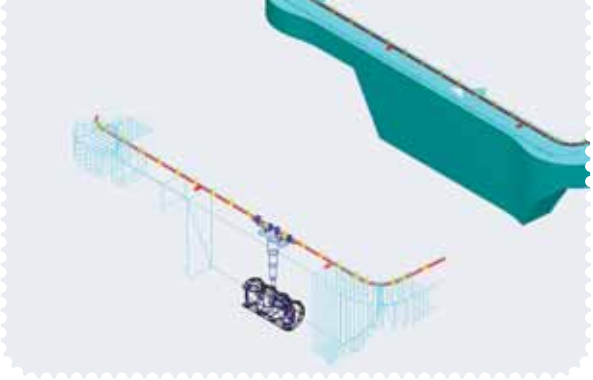
You can implement the dryers in various forms using the assigned tunnels. The tunnel profile as well as all the TRICAD MS® elements consist of MicroStation cells which can be expanded any time as required. Filters and nozzles can be inserted retrospectively. Lines can be formed according to various criteria. First, you select the tunnel profile and then define the corners between which the nozzles and filter elements are to be installed. Then, you determine the size and shape of the nozzles and filters.

The floor, wall and overhead robots are positioned in the booths as required with the respective travel path. With overhead robots you can arrange up to four units exactly to scale with just one click. After positioning components render settings are assigned automatically so that booth fittings become visible. With the slight transparency of the booths it is possible to view the entire installation.

Using the TRICAD MS® Conveyor Systems you can include all the required types of handling in the painting line to establish consistency with the other modules. You can also carry out an envelope-curve calculation using the TRICAD MS® Tractory Curve program, in particular for shuttle conveyors, VarioShuttle and RoDip.

You also have the following functions available:

- Positioning of the plenum, spray booths, rinsing system
- Exhaust-air dryer with different inputs and outputs as well as types of construction
- Wall-installation components such as windows, doors, filters, lights, etc.
- Connections for pipe sockets, rivet plate and ventilation points for further processing in TRICAD MS® Ventilation or Piping
- Working platforms with different coverings
- Esta, Blower and Emu booth fittings
- Component groups for units, applications, structure, operating consoles, metal sheet, equipment, paint supply, filters, lights, gantries, supply rails, wall cabinets, etc.
- Parametrised functions for housings and dipping baths



Logistics Planing & Tractory Curves

With this tool you can calculate and display tractory curves for road vehicles. Furthermore, the module enables you to determine envelope curves and surfaces along the materials-handling routes. You define the course of the tractory curves for various types, such as polyline, manoeuvring, mouse travel, destination, supply route or also guide board or free travel. The specific distances and dimensions of the vehicles are individually adjustable. You can specify the number of individual positions for the calculation using an increment. The calculated envelope curve and the determined envelope volume are enlarged by an offset value. With the calculated results files you can display the vehicles in two or three-dimensions in various depths of detail, superimposing them or masking them out as required. You can simulate the route based on 3D objects.

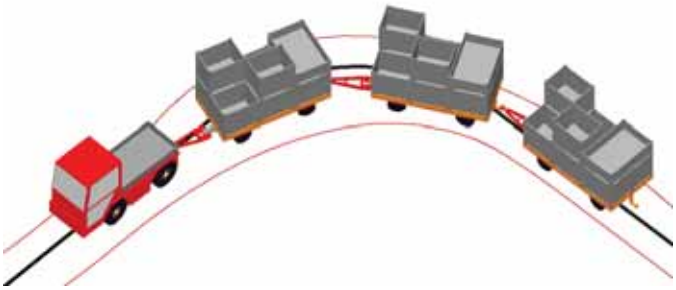
The following types of vehicle and materials handling are integrated:

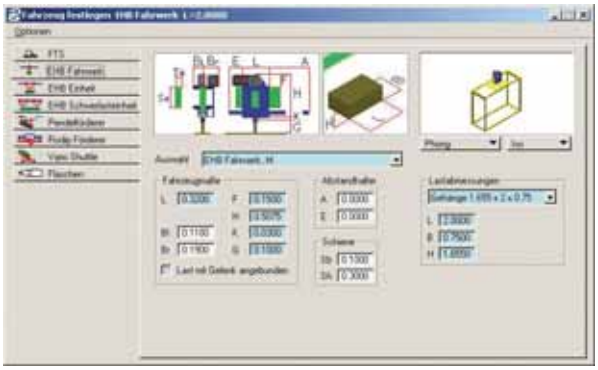
Road vehicles

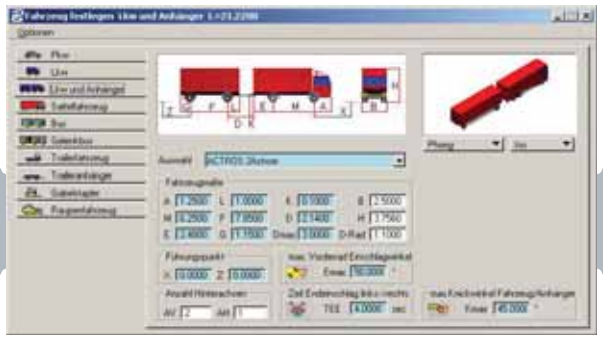
- Cars
- Trucks, with and without trailers
- Articulated vehicle
- Bus/articulated bus
- Trailer vehicle, with and without trailer
- Fork-lift truck
- Crawler truck

Materials-handling systems

- Automatically guided vehicles (AGV)
- Electrical overhead monorail chassis
- Electrical overhead monorail unit
- Electrical overhead monorail heavy duty unit
- Shuttle conveyor
- RoDip conveyor
- VarioShuttle







Crane Units

With the specially developed TRICAD MS® Crane Module you can produce 3D layouts for various crane systems very easily and quickly. The predefined modular principle supports you in the selection and positioning of various types of crane. Here, the complete crane variant incl. all accessory parts is always applied as a unit.

The following types of crane are currently supported:

- Standard travelling crane
- Revolving crane
- Slewing crane
- Wall crane
- Crane construction kit
- Loading gantry
- Double-boom travelling crane

TRICAD MS® includes all functional features for fitting steel construction profiles. You can adjust several parameters at the same time, from the width, height and length through to the profiles. In addition, you can define supports as well as suspension brackets, wall brackets, foot-plates and end plates. For the exact design angle simply specify the reference point, angle and Z-coordinate.

Using the command <TENTPNT>, you construct the steel structure "TEMPORARY" at the defined coordinate. Then you simply change the values such as length or the steel profile by selecting "UPDATE GRAPHICS" so that the graphical display is set up correctly. It is easy to insert the steel structure into the design file, because all elements belong to the same graphical group. Using the available templates, you can quickly adjust the type of construction, crane trolley and working load of the gantry crane.

Swarf Conveyors

With the swarf conveyor module you can quickly and conveniently model various handling systems for swarf disposal. Simply use the existing kit with parametrised objects for emulsions, oils and dry swarf.

The following types of conveyor are used for modelling:

- Scraper conveyor
- Slat-band chain conveyor
- Push-rod conveyor (harpoon conveyor)
- Flume conveyor

Speed up your design work with components to suit the handling method. These include tub, elbow, media outlet, tension station, drive station, terminal, nozzle switch, outlet, pipe connection, vane, funnel and many more. All these components are stored in an XML data base file.

With the cutting emulsion you can exploit the possibility, for example, of adapting different types of swarf and their program structure. The types are divided into short and long swarf, woolly swarf, dust and swarf balls. The required components are saved with the parameters appropriate to the respective type of handling.

For the graphical display of objects you have a choice of line, surface and sheet design. The appropriate maintenance area is already assigned during the design. Properties such as levels, colours and lines can be individually defined for the specific types of handling and maintenance areas.

For the scraper, slat-band chain and push-rod conveyors you can define the design angle with the displayed nine reference points. With the flume conveyor you have the three upper design angles available.

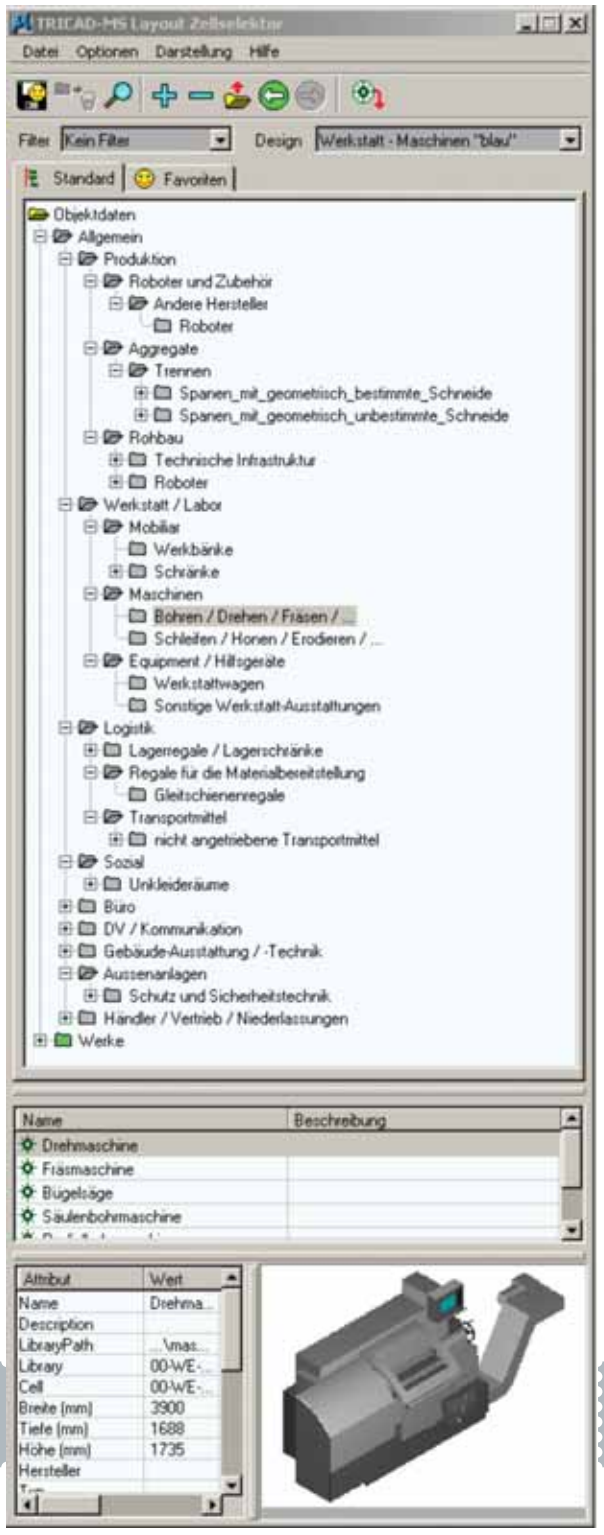
Layout Module

The plant layout module provides you with the ideal tool for quick and easy positioning of components throughout the whole factory. You can integrate new and existing MicroStation components and those from AutoCAD® without complication. As with the specialist applications, with these elements you can additionally assign the TRICAD MS® intelligence.

The layout module covers a very wide spectrum in factory design. As the user, you have more than 5,000 objects available in the most varied categories. The scope includes fields such as production, workshop and logistics as well as the office, DP communications, building outfitting/engineering and outside facilities (see illustration on the right). Furthermore, the module includes parametric functions for fences, trapezoidally corrugated sheet, partitions, walls, windows, installation elements, apertures, doors, bollards, collision guards, crash barriers and many other features.

The application supports you and your co-workers in the generation of components and leads to a standardised result for all colours, levels, line thickness values and component sizes as well as a homogeneous filing structure. In addition, you assign object attributes and the program checks the relevant working step. In this way standards are quickly and easily maintained.

With the expansions for machine and loading equipment preparation, you get a powerful tool with which you can place your new and existing machines and show the space requirements in no time flat. Connections (e.g. water, cooling, etc.) can be designed with the other TRICAD MS® modules. You can design shelves, even high-rack storage areas, in seconds.



Qualitool

It is difficult to overestimate the importance of the Qualitool, because the CAD data quality of your projects is becoming increasingly important. The inspection should take place as early as possible in the process, particularly because the data inspection and documentation take up so much time. Using the Qualitool check the design files for the specified company standards and document the inspection results directly in the drawing. This enables you to implement the automatic correction of your data.

Here, is a summary of the functions in more detail:

- Inspection of MicroStation elements (level, colour, type of line, etc.)
- Checking of the TRICAD MS® intelligence via rules
- Comparison of the data with env (CAD specification)
- Generation of inspection logs and issuing of an inspection stamp in the drawing
- Examination of single or multiple files (batch) and issuing of an inspection stamp
- Statistics function with log
- Checking of open strings

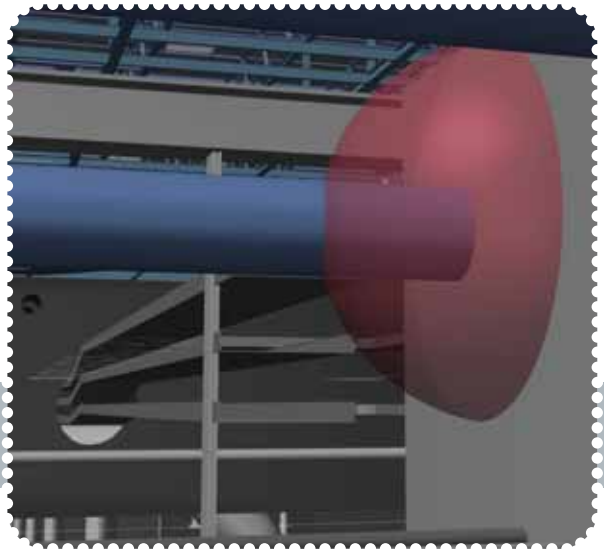
NavisClashBack

This programme allows you to read any Autodesk®-Navisworks®-XML collision file. NavisClashBack checks whether all drawings belonging to the entered collisions as master or reference files are loaded in MicroStation and displays missing DGN files.

Display all collisions at once in MicroStation and then process them. By clicking on the listed collisions centre the colliding units in a set view and mark them with a ball on the collision point.

To allow you to quickly find the complex models, the following aids are available:

- Extract external reference files
- Extract all objects from collision units
- Flashing display of collision units
- Automatic preparation of segment volumes around collision units
- Display of collision density
- Simple change in size and display of marking ball



Fire Protection Layout

Use the TRICAD MS® Fire Protection Layout to prepare escape and rescue plans, complete with fire protection symbols, guides and labels, and including planning of direction arrows, area identification and edge markings.

This module was developed for Daimler AG. Care was taken to achieve easy expandability and adaptive functionality, so it can be used successfully throughout the world.

Its use was adapted to the entire TRICAD MS® product assortment, so every TRICAD MS® user can quickly learn to use this module. Cells saved by the user can be made globally available by the key user, so double cells and the time needed for them are now things of the past.

With the TRICAD MS® Cell Selector, cells are placed in MicroStation drawings. The program reads various XML files and graphically replicates the XML tree structure. The cells assigned to the active XML node are listed, and the attributes and graphics belonging to the active cell are displayed. The cell can be placed by double-clicking on the cell in the list box. The tree structure can be built up independently of language; all displayed texts are replaced by the layout program depending on the set language.

With the list function, the layout cells in the MicroStation file can be recorded in terms of their number, and the attributes in the cells can be evaluated. The list is output through a Microsoft Excel file (optional).

The rules of behavior in case of fire and in case of accidents are presented clearly and in short, concise form. For the behavior in case of fire, the same presentation is normally chosen as for the Fire Protection Code Part 1.

The escape and rescue plans are presented in accordance with DIN 4844-3 and BGV A8 (German Employers' Liability Insurance Association regulations). Especially in public buildings, it can also make sense to prepare the documents in multiple languages.

With this tool, owners and operators of buildings and large-scale facilities can easily meet the legal obligation to post escape and rescue plans "when location, extent and type of use of the workplace require it" (§4 par. 4 Arbeitsstättenverordnung (German Work Safety Regulation) of 20 July 2007):

- the building floor plan or parts thereof,
- the course of escape and rescue routes,
- the location of first-aid equipment,
- the location of fire protection facilities,
- the location of assembly points,
- the location of the viewer.

Highlights:

- Placement of fire protection symbols
- Leader lines
- Planning of direction arrows
- Symbol groupings
- Adaptation of symbols
- Expansion of symbols
- Dimension evaluation

Symbols:

- Fire protection symbols
- Rescue symbols
- Hazard symbols
- Firefighter symbols
- Own symbols

TRICAD MS®
Building Services Engineering

In addition to Plant Design TRICAD MS® fulfils all your requirements for CAD Building Services Engineering solutions. Whether you want to design simple or highly complex installation plants our high-performance construction module offers you comprehensive support.

In detail the following modules are available to you:

- Building Module
- Heating / Coldness
- Sanitary
- Ventilation
- Sprinklers
- Electric
- Schematic / Infrastructure

Use these construction modules to design, calculate and assess complete plants for technical building services. The size of the plant thus plays no role. The modules are practically identical in working method. The construction itself takes place in 3D mode – whether in front view, top view or isometric drawing.

Define pipe or conduits simply by selecting start and end points. Automatically set bends. Expand your work intuitively with formed parts as in Lego modular design. You can freely set the parameters at any time. Using Info button easily show and change all attributes of individual objects. This will enhance accuracy and improve your productivity. A full hatching of conduits, pipes and components and a display of covered edges (online) as well as a cable model come as standard.

Using layout generation prepare plot layouts with automatic generation of shadow and tier symbols as well as covered edges. You can convert all attributes (object data) into DWG file format, especially for the AutoCAD® area. This makes it easier for AutoCAD® users to read out the complete TRICAD MS® information using object attributes without applications.

For calculations you are provided with appropriate programmes over the entire range of technical building services. Mass assessment takes place using Report manager via Microsoft Excel in each module and can be easily edited.

Implement gap planning – independently of the architecture – at any time in each trade. Prepare legends for the positioned components automatically in the model. The labelling of the object is associative and thus changes by itself.

Map plants using a tree structure as in Explorer. Search and change components easily.

TRICAD MS®
Plant Design

TRICAD MS® represents the ideal supplement for your company for plant design, pipe network construction or paint and coating technology. Due to the interfacing with building services engineering and factory design, you are able to cover all aspects of plant construction.

Here, you decide based on module orientation which application is relevant to your field of work:

- P&ID
- 3D Piping
- Pipe Categories
- Database (vDB)
- Isometrics (Iso X)
- Report Manager
- Construction Modelling
- Structural Steelwork

Use the unique possibilities of combining intelligence and intuitive features through synergies between the individual modules. The impressive highlights include the full integration of P&ID and Piping 3D for plant construction in the standard functional features of MicroStation with its intuitive operation. Avoid redundant data by saving the drawing intelligence directly in the design file.

Work interactively between the modules thanks to a central database which you can switch in as required. In this way you expand the possibilities presented to you by the TRICAD MS® modules P&ID and Piping 3D. You can make this combination of modules an even more powerful and effective design tool by the 100% matching between 2D and 3D.

The linking of existing databases to TRICAD MS® is also possible. You can also assign externally available documents and specification sheets and/or parameters for vessels, pumps, etc. to the object. Finally, you can generate the production isometrics incl. dimensions, parts and welding seam lists using Iso X. The PCF file generated thus contains all the key data you need for the stress computation with ROHR2 from SIGMA Ingenieurgesellschaft mbH .

You can obtain more information from the TRICAD MS® Building Services Engineering and TRICAD MS® Plant Design brochures that we can send you if you wish.

TRICAD MS® Licensing Model

Each software package installed at your company needs a licence. Use the various options offered by the TRICAD MS® modular licensing model:

- Local licence (single terminal solution)
- Floating licence (flexible server solution)
- Floating licence with check-out
  (all the benefits of a server licence without foregoing the flexibility of a single terminal)

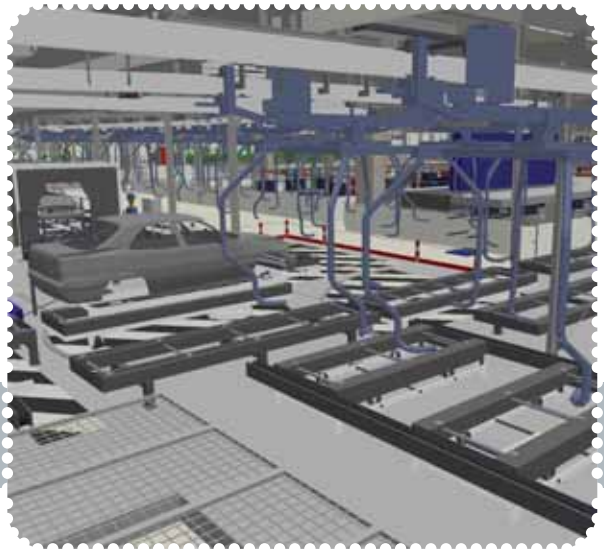
If you check your software status and have to order missing licences again, we will be happy to help.

MicroStation System Software

MicroStation V8 XM is the CAD basic platform for using the TRICAD MS® product range. This platform-spanning high-end CAD solution is operated world-wide in various market segments and forms the basis for all your constructions and models, plot management and the graphic display of your work. You can attach data in DGN, DWG and DXF format using reference technology. A hybrid treatment is likewise possible. A floating licence is installed in the form of a service on a Windows server.

System requirements

Hardware	Current standard PCs or notebooks
Operating system	Windows XP Professional or higher
CAD core system	MicroStation V8 XM Edition/ PowerDraft 2004 Edition or higher
Display screen	Single or double screen solution possible
Graphic cards	All graphic cards that are permitted for MicroStation, at least 256 MB or higher
RAM, memory	At least 2 GB, fixed disc >100 GB



VenturisIT and TRICAD MS®

Together with TRIPLAN Engineering, VenturisIT has in the last 20 years invested in employees, software and technology in order to develop a general range for customers in edificial engineering, plant design and digital factory planning.

With the introduction of the TRICAD MS® product range for PC-based 3D construction, VenturisIT has set a milestone in the engineering market. Worldwide, considerably more than 3,000 installations and more than 450 employees in the group of companies have made us one of the leading suppliers and developers of IT complete solutions. The resounding success of TRICAD MS® confirms us in the aim of continuing to offer solutions and process-oriented IT products and concepts appropriate for them, guaranteeing our customer the maximum use of cutting edge technologies.

TRICAD MS® has also contributed decisively to the success of the global integral planning of German car manufacturers in digital factories. This strategic goal has led to all highly complex factory plants revamps and rebuilding being visualised three-dimensionally before implementation.

All essential professional trades are considered for various planning concepts in a virtual space and checked for constructability. Today VenturisIT is an international software company which creates synergies with its customers. Together we are pursuing the goal and vision with which our company was founded: Innovation as the means to an end and not an end in itself.

This brochure was sent to you by:

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- Eisenman
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- Imtech
- Kuka
- Miele
- Seat
- Siemens
- Skoda
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