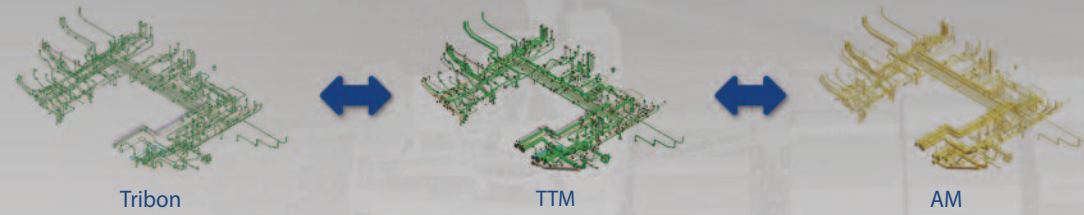


Data Exchange

- Import/Export model data and standard data to Tribon/AM
- Import/Export IGES/STEP data
- Import/Export DXF 2D/3D



Real Time Collaboration

Real Time Update of the display

- Real time Update of the model display in working environment, where the model has been modified by another user
- Work together with other users based on message

Real Time Collision Check

- Real time Collision check
- Result display and check the parts collided (Highlight, Zoom)
- Collision check with existing models in the database even the models are not inserted in working environment

Collaboration based on Message

- User can send a message to Object, which is automatically transmitted to the owner of the object
- Automatic notification to the owner when a model is modified by other users due to a relationship



The New Shipbuilding CAD system

TTM



TTM is a shipbuilding oriented CAD system developed by Timetec Co., Ltd, that supports all technical capabilities from modeling to production drawings. TTM is the latest CAD system aiming to increase both design and production efficiency with its visual and intuitive user friendly operation, incorporating new technologies such as Solid, Relationship, Parametric, Template & Rule based modeling, Revision control, Undo/Redo, etc.

TIMETEC

TIMETEC CO., Ltd 16F, Centum Science Park Bld., U-dong, Haeundae-Gu, Busan, Korea, 612-020
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TIMETEC
www.timetec-ttm.com

TTM MAJOR FUNCTIONS

TTM DRAFT AND VIEWER

TTM Key Features

Aiming towards 30% increased productivity

Consistent design (link between initial and production design)

- Hull : Reuse of modeling data with inheritance in production design from initial structural design
- Outfitting : Automatic generation of production 3D model from diagram

Collaborative design

- Real time collision check and automatic model updates for up to date working view
- Message based collaborative design
- Automatic change of models from model relationship

Modeling automation and easy editing

- Easy operation : GUI based input, visual operation, Undo/Redo
- Easy shape change via parametric modeling, node movement
- Reuse model data with design edit function
- Automatic design using Unit, Template and many other specific modeling programs such as pipe support, seat, and etc.

Data exchange

- Import and export model data from Tribon and AM
- IGES and STEP import and export function for 3D Model

Automated production information

- TTM contains of most In-house programs required for generating production information, so that high quality drawings and reports can be automatically generated immediately after modeling in TTM
- Easy drafting (including high performance Draft functions)
- Link between 3D Model and drawing elements (allows modification of the model in drawing as well as dimension, text, etc.)
- Integration with windows software, (allows copy & paste from Excel and Bitmap image)

Systematic rule check

- Rule check function for hull panel, i.e. identifying missing and matching between nesting drawings and models, and design rules
- Check function for any differences between the diagram and the 3D pipe model

Application of new technology

- Solid based modeling, NURBS(Non-Uniform Rational B-Spline) surface
- Undo-Redo/Revision control / Parametric modeling/ Template modeling/ Visual operation / Fast response

TTM Facilitating Functions

Crash save

- Automatic save function similar to that used in MS Office in case of an unexpected power cut or TTM Error
- Work prior to the crash is saved to the user ID as (USER_ID_(TTM_APP)_OPER_LOG)
- By logging on with the same User ID and running the TTM module, saved work can be recovered (requires confirmation by the user)

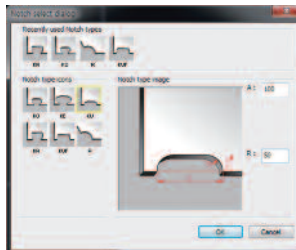
Message

- Message management, similar style to that used by MS Outlook
- Able to use the message function without running TTM in Windows
- Automatic notification to the owner (or group) when a model is modified by a relationship operation
- Automatic "pop-up" notifications for new messages upon login

Selection help

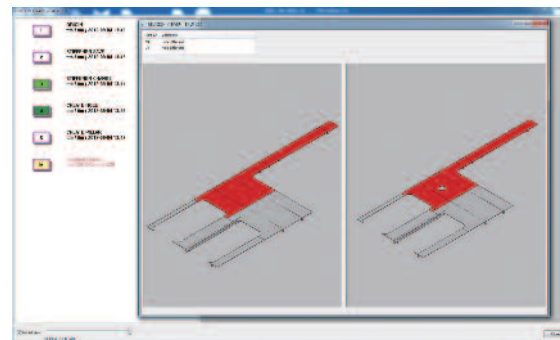
- Automatic recommendations of various selections during modeling
- Rule-based recommendations to help selection
- Selection history available of the most commonly/recently used functions

Selection Help



Revision functions

- Save model as a new version as required
- Easily check of the version status from the Model Tree
- Compare functions between two different versions, through text and graphics
- Recover a specific version
- Easy check variations through the versions using revision explorer



Revision Version Explorer

Windows Interface

- Copy & Paste bitmap images and text from Windows to TTM
- Copy & Paste Excel data to TTM, where cell data can be modified in TTM individually or as a complete set of data

Clipping & Sliced View

- Simple slice function for modeling environment creation
- Clipping function to make a sliced view for production drawing and installation drawing with information

Floating Window

- Modeling possible in a separate floating window opened from the main program
- Dual monitor setting available for more efficient modeling

Recycle bin

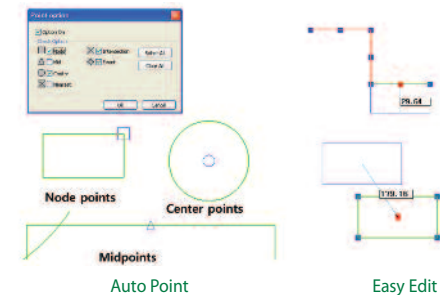
- Recovery of deleted Objects possible (similar to MS Windows)

Hot keys

- Assign standard hot key for projects and/or companies
- Reassign hot key for personalized use by each user

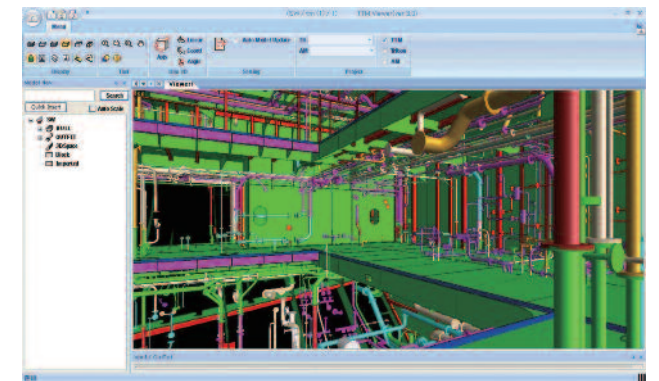
Draft

- Easy and powerful basic 2D drafting function (Geometry, Text, Model, Dimension, etc.)
- Automatic pointing function for input of various options, including Nodes, Midpoints, Intersections, and Arc centers
- Use of the layer function for geometry properties that can be changed easily including thickness, Line type, color and text
- Simple and easy Edit function
- 3D modeling possible in 2D drawings
- Wire frame display for arrangement drawing with hidden line removal, also allowing Copy & Paste from modeling Window that may be used as a sliced view
- Associated Text, Pos No, Note, Dimension etc, so that the Geometries are modified automatically according to the modification of the 3D model



Viewer

- Design check with Walk Through and simulation for verifying equipment's operation and removal
- Check model and dimension information
- Message function for easy real time collaboration between design and production office
- Convert a full 3D model to a Lightweight model for faster operation and Web/Mobile compatibility
- Display drawings related to 3D Model i.e. pipe spool drawing etc.
- PDF creation(2D,3D) for production drawing



TTM Modeling

Parametric modeling

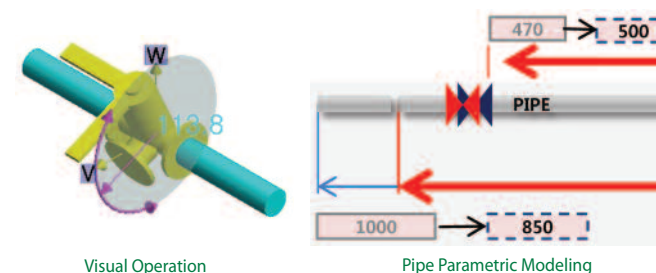
- Modification of models by editing Dimension text, or by manual arrow dragging
- Modification direction can be controlled in one or both directions by changing the arrow direction,
- Available in Pipe, Structure, Hull Panel, and Volume modeling

Template modeling

- Template is a standard that includes parameters and rule definition. The model can be modified by the change of parameters and rules during creation of the model and even after creation
- Available in Structure and Hull
- Structure template can change the shape of the model according to its parameters, which is controlled by the Dimension, Section Size and Material and available special template for supporting Built-Up Profile, which is handled as one part in modeling but as handled as individual parts in production
- Within Hull, all parts defined in Template are automatically created for the new target boundary. If the new boundary is not the same as Template, parts such as stiffener or hole can be automatically modified according to rule

Rule Based modeling

- Some rules do not allow the creation of a model where the model has violated the rule



Visual Operation

Pipe Parametric Modeling

- Various rules can be defined i.e. stiffener end connection, slot hole parameters, etc. These rules are applied automatically, with easy retrospective change the rules if required

Relation

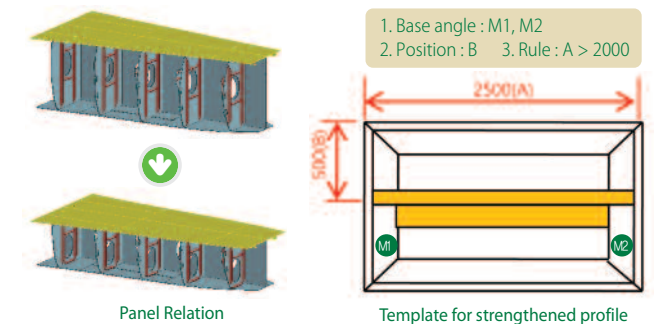
- Automatic modification of models according to its relationship, such as between Hull Panels, between Equipment and Pipe, Structure and between cable way and tray.
- Related models are easily identified, with easy addition or release of the relation
- Able to copy and clone a relation, where a change will be applied to all clones

Unit

- Multiple models can be grouped for reuse as a unit (Hull Panel, Pipe, Structure, and Equipment)
- Preview, Drag & Drop functions of Unit Tree
- Renaming function, if the assigned name already existed prior to its creation
- Automatic relationship of Unit, allowing unit operation such as move, copy, delete for whole models within unit

Visual operation

- Easy to use with an intuitive and visual operation

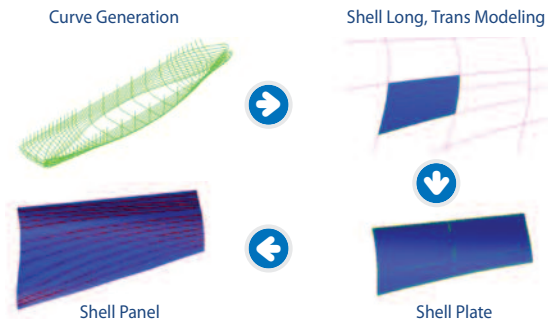


Panel Relation

Template for strengthened profile

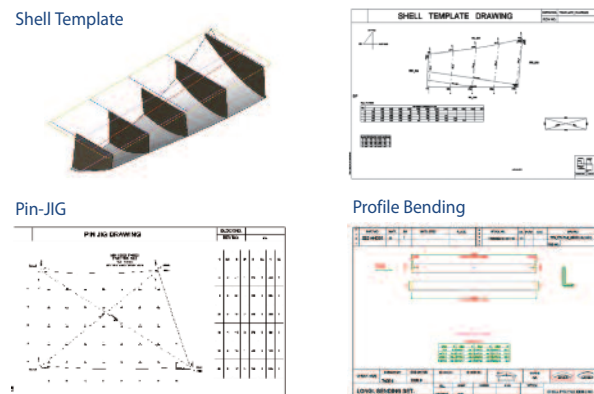
Shell Panel

- Support NURBS(Non-Uniform Rational B-Spline) surface and import surface via STEP/IGES interface
- Various functions for curve/seam generation from surface
- Interactive profile modeling with twisted angles and define functions for endcut, notch, hole
- No limitation of the number of boundaries for shell plate and attributes such as excess, shrinkage and thickness are easy to define

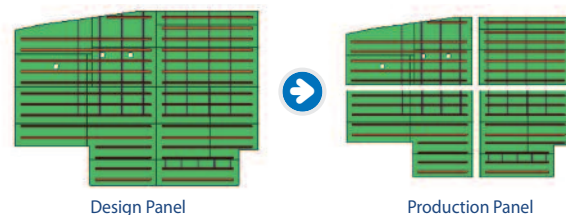


Shell Panel Production Information

- Shell plate development
- Pin jig & remarking drawing
- Shell expansion drawing
- Shell profile bending drawing
- Shell plate template



Design / Production Panel



Design Panel

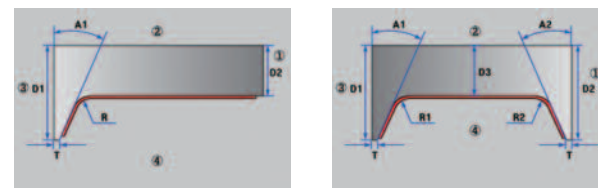
- Structurally identical Large Panel for rapid and easy modeling, which can subsequently be split for use in the production Panel
- To be used in initial Structural design with Standardization and Automation

Production Panel

- Inherited from Design Panel by adding and re-defining the information for the production such as bevel, excess, block name and other production attributes
- Split to production parts with re-generation shape regarding various excess

Modeling

- Interactive modeling in Section or in ISO View (real 3D modeling)
- Easy creating and editing of boundary with powerful drafting functions and Define Curve function which enables to create complicated curve and edit with parameters
- Fast modeling with automated modeling functions like Parametric, Template, Rule based modeling
- Automatic update of all parts or panels with relationship according to the change of single part or panel
- Automatic endcut in connection between plate and stiffener and other case as well
- Support Built-Up panel and parametric bracket, which are both standards enabling easy creation and edit of parameters



Examples of Built-Up Panel



Automatic update by modification of the hole

Rule check

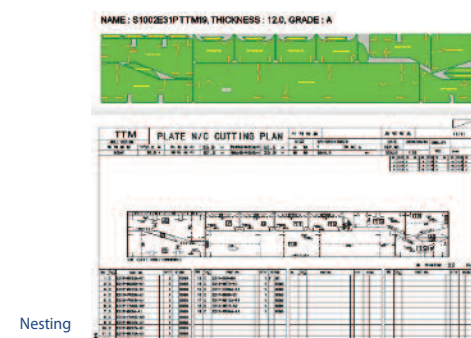
- Rule check to verify any mismatch between the model and defined rules, which consist of design practices such as minimum distance for welding, direction of bevel, excess and etc.
- Visual display of the result



Visual display the result of rule check

Production information

- Symbolic view for preparing the assembly drawing with easy to use draft function
- Assembly management by TTM Assembly Planning and automatic generation of assembly drawing
- TTM's own Nesting program (plate, stripping & profile)
- Automatic generation of production drawings for shell panel and profiles



Nesting

Modeling

- Support of Spec driven modeling and resize and respec functions
- Improvement of routing system to minimize mouse movement and clicks
- Convenient Point input (automatic capture of Event, Node point and easy Offset function)
- Semi-auto routing: based on Box/Geometry/Pipe
- Powerful align function for pipe support modeling
- Axis-based routing
 - Select axis for lock the line and plane
 - Select the option at icons just below the axis menu



Route

- Easy modification function using visual operation such as Node movement that allow the modification of the pipe line with a movement of any edge or side to its new direction.

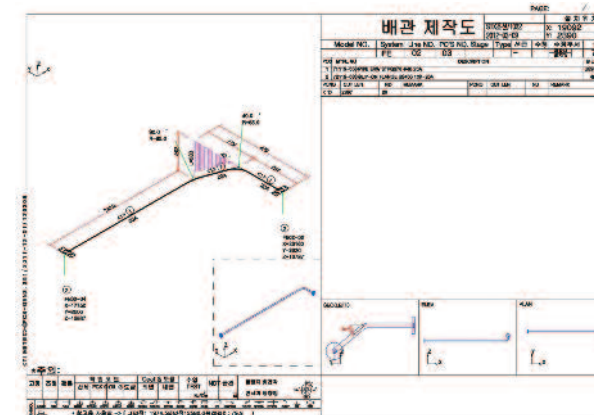


Parametric modeling

- By changing the dimension text, the pipe line can also be modified
- The modification direction can be controlled by the indicating arrow of the dimension

Quick modeling using Diagrams

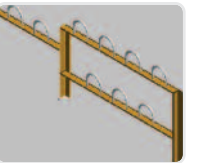
- Modeling information can be fetched from the Diagram
- If equipment is modeled with even coordinates only, the pipe can be automatically modeled with the information defined in Diagram
- Check function for any mismatch between the Diagram and the 3D models



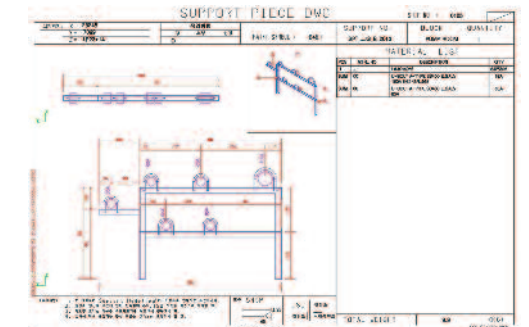
Pipe Spool Drawing

Pipe Support

- Easy Pipe Support modeling function with various standard types. New standards that are required can easily be added without involving any programming tasks
- Automatic creation of Pipe Support from the user's choice of Pipe and Plate only.
- Relate/Un-Relate functions



K Type



Pipe Support

Diagram

- TTM Diagram is developed based on TTM Draft, a Timetec self-developed software included in TTM
- Easy-checking of the working status the 2D Geometry with color-coding for different statuses, i.e. green for undefined geometry, yellow for defined geometry and red for completely defined geometry
- Automatic check of the modification in case the component has been changed during modeling
- Excel import/export function to define or modify the major information in diagram



Quick Route using the diagram

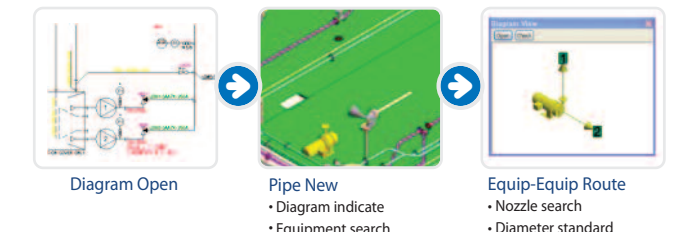


Diagram Open

Pipe New
• Diagram indicate
• Equipment search

Equip-Equip Route
• Nozzle search
• Diameter standard



Route modification
• Move node • Parametric • Zero bend



Box select
• Select the outline path of the box

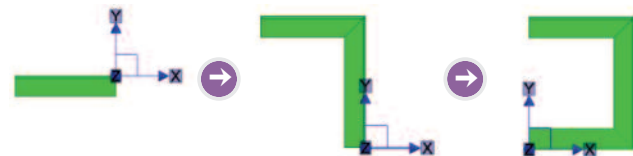
TTM STRUCTURE

TTM CABLE AND ACCOMMODATION

Structure

Modeling

- Route mode profile modeling with automatic endcut adjustment
- Support parametric modeling and template modeling
- Support built-up profile modeling with a special template, for easy modeling and editing with parameters
- Automatic adjustment of the end shape to 2D-line/ 3D-Plane/ Profile/ Plate
- Group function such as Transform, Copy, Delete, Stretch, Divide



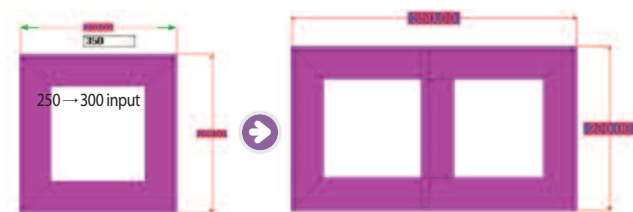
Profile modeling with route mode(Automatic adjustment of endcut)

Parametric modeling

- Model modification through dimension text
- Model modification through dragging of dimension arrow
- Direction of change decided by indication of dimension arrow

Template modeling

- Template is a standard including parameters and rules for the material and size
- Rule is defined as the mathematic calculation with the length of structure defined by normal dimension for the purpose of adding single or multiple enforcement profiles with interval length also defined within the rule

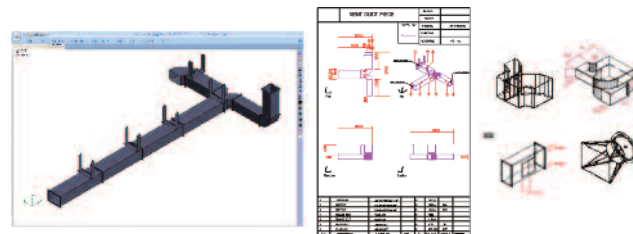


Edit of dimension text changes the shape of the model

HVAC

Key features

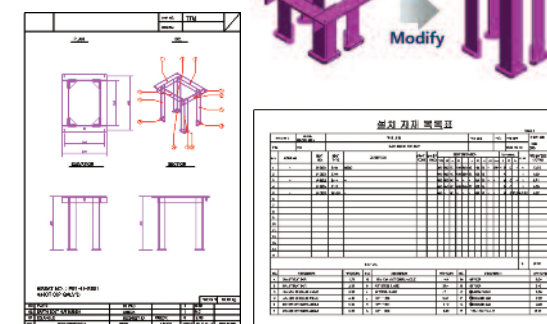
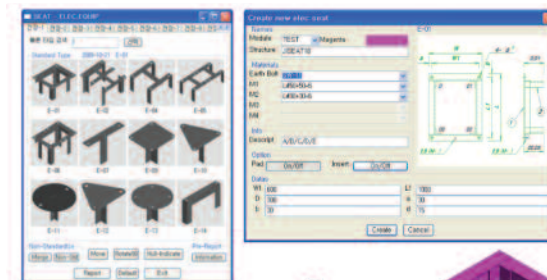
- Simple parametric modeling for rectangular duct and support for various extension types
- Require only plate and profile components for rectangular duct modeling
- Easy modeling functions i.e. resize, separation, linkage, movement, etc.
- Included duct support modeling
- Automatic generation of production sketches
- Easy modification function with node-movement and parametric modeling



Seat

Key features

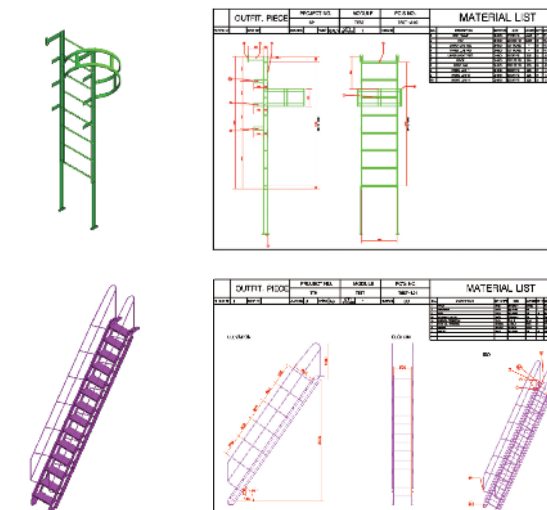
- Standard pool with over 500 Types, which the user can choose from. Option to set -up customised GUI with selected standard types from the existing standard pool
- Easy to add new standard types if needed
- Option to model seat with equipment with a simple set-up, and to include this in production sketch
- Various easy editing functions for the modification of parameters including size or movement
- Automated generation of product sketch



Traffic

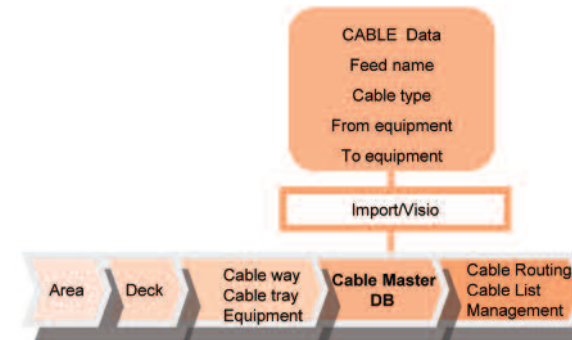
Key features

- Support Inclined ladder/vertical ladder/handrail
- Simple modeling with input of the parameters
- Easy modification function for parameter change in the same GUI used in creation
- Automated generation of product sketch



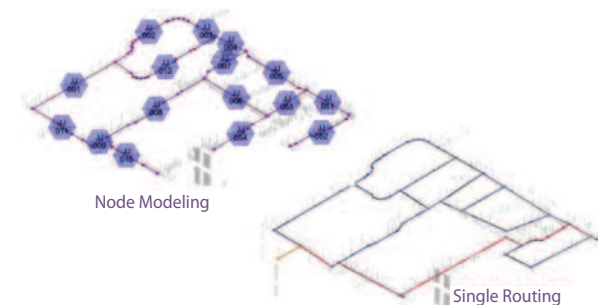
Cable Schedule

- Cable modeling function with two separated programs, Cable Visual Router and Cable Manager



Cable Visual Router

- Interactive routing function in TTM environment
- Support cable way and tray modeling with a relationship between cable tray and cable way (i.e. modify the cable tray if the cable way is modified, and vice-versa)
- Automatic search of the cable path with the shortest distance, whilst considering key conditions for cable routing such as area condition and interference condition
- Fast multiple routing capable

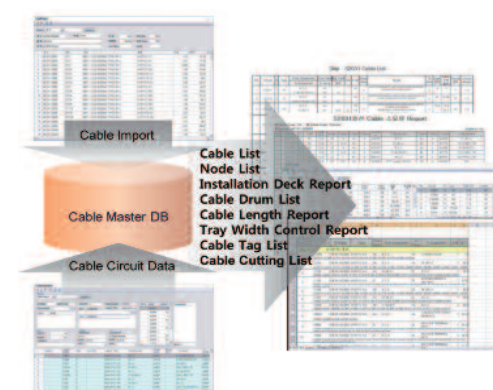


Routing conditions

- Area : maximum area in place restrict the cable within the defined area
- Interference class: control the passage according to interference classes that defines both in the cable way and the cable
- Location class : if location classes of cable and cable way do not match with each other, eliminate the passage of the cable through a special hole or a way with a location class
- Routing range : divide routing area with Set Point, allowing routing to be done in 2 stages or by 2 people

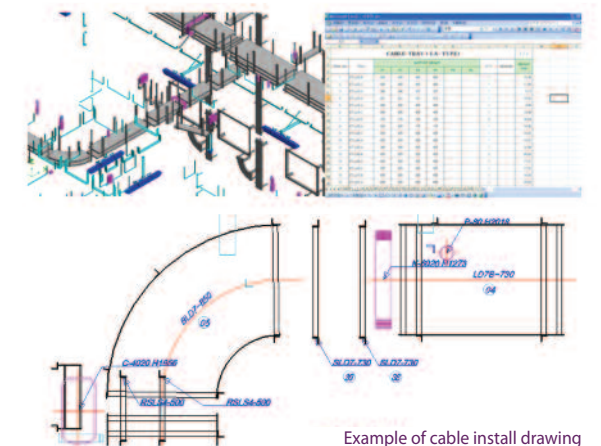
Cable Manager

- Management program for all cable data creating all necessary reports for cable work including purchasing, production and management
- Cable manager and Cable Visual Router work on integrated environment with access of same DB



Cable Installation Drawing

- Automatic display of information such as name, height, necessary symbols and etc
- Support various types of models such as main tray, FB tray, coaming, special main tray, special FB tray, lighting seat, pipe spool and etc.



Example of cable install drawing

Accommodation

Room

- Room is defined based on Deck. All parts related to accommodation are contained in the room
- Edit functions such as Copy/Move/Delete

Deck cover

- Modeled with cover type and thickness
- Symbol of deck cover can be displayed on deck cover

Furniture/Equipment

- Symbol based modeling : 3D model is automatically created at the same time when the symbol is arranged
- Height above the deck and component name is defined in table in advance, which is used for the automatic creation of 3D model
- Conversion function from 2D drawing containing accommodation symbols to 3D model

Wall

- Modeled in case the basement is not flat (Camber)

Ceiling

- Automatic modeling with ceiling direction and additional functions for Profile and Hanger modeling

Material List

- Material list can be created for Room(s), Deck and for Wall, Ceiling, Deck covering and etc.

