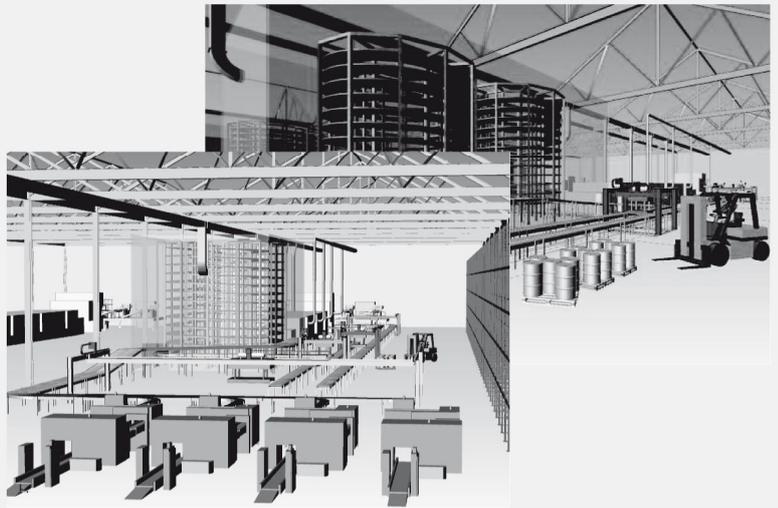




# CAD Schroer Consultancy Services

## Factory Modelling Prevents Painful Problems

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## Factory Modelling Prevents Painful Problems, Cuts Costs and Revolutionises Project Reviews

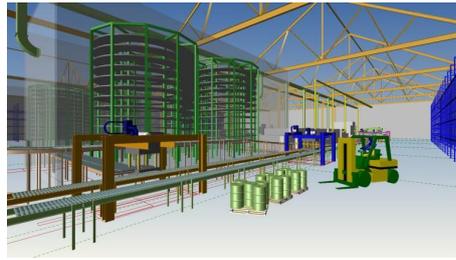
Factories have a life that spans decades, so it's no surprise that many Owner/Operators have a wealth of incomplete paper layouts or digital 2D drawings which only document part of the current set-up. As facilities gear up for flexible manufacturing, regularly changing in order to quickly introduce new product lines or the latest equipment, an accurate lifecycle model of a factory becomes vital. Engineering software provider CAD Schroer has recognised this trend, and offers a factory modelling service as part of its solutions. The company is helping project engineers in the UK process sector to quick-start factory modification, refit and brownfield projects.

### From 2D to Large-Scale 3D

"Many factory owners have project-driven engineering departments handling layout design in-house for multiple sites," explains Bill Wilkins, Technical Sales Manager at CAD Schroer UK. "When we are asked to help on a project, clients are typically using 2D drawings for factory layouts, and find it hard to position machinery and route services effectively; to visualise clearance spaces between equipment; and to communicate important project information to non-technical managers."

Where complex production processes run on multiple factory levels, changes require detailed knowledge of what's already there, how it's positioned (hard space) and what space is required to safely run and maintain equipment (soft space). When there is such spatial complexity, 2D drawings are an invitation to get things wrong or overlook important information, which translates into unplanned down-time and expensive re-work if new lines don't fit into existing spaces or can't be operated or maintained efficiently.

As a result, some of CAD Schroer's customers have tried using traditional 3D mechanical CAD software on factory projects, but with limited or no success, because these systems were developed for designing pieces of equipment or single assemblies in



A food processing facility designed on the basis of 2D layouts. The steel beams, pipes, ducts and conveyors are standard parametric catalog components automatically modelled in 3D.

great detail; not for laying out thousands of pieces of equipment and routing complex pipework, conveyors and steelwork. The sheer model size, as well as a lack of interference checking and specialised layout capabilities, quickly hampers productivity.

"A project to build a new processing line might cost £15-£20 million," explains Mark Simpson, CAD Schroer's Product Line Manager. "When you're looking at that kind of spend, and at project time pressures, it's imperative that the design is right; that the factory will run as efficiently as possible; and that the project stays within budget – that's why it is important to take a large-scale 3D approach, and why we are asked to help."

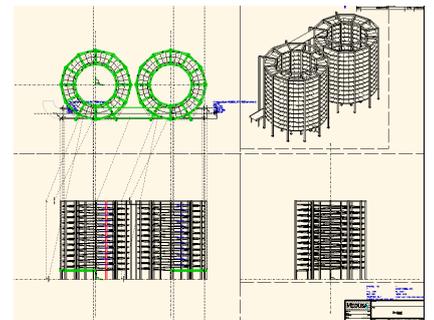
CAD Schroer's catalog-driven, multi-user 2D/3D MPDS4 factory layout and plant design software offers an integrated design environment and comes with thousands of standard components, from steel beams to conveyors, which can be easily routed and auto-modelled in 3D. MPDS4 is designed to make the transition from 2D to large-scale 3D layouts as easy as possible, especially in combination with the factory modelling service for customers on tight schedules.

CAD Schroer's services include the 3D layout of factories from existing 2D plans; creation of 3D equipment models from 2D drawings or from laser scans of existing factory equipment; and the layout of new production lines to suit customer requirements.

### Modelling New Production Lines

"Some customers have already ordered the machinery for a new production line when they come to us. Deadlines are looming, and the challenge is to fit new equipment into an existing process and tight spaces with minimal disruption. With factory changes becoming ever more frequent, the creation of a virtual factory - an up-to-date large-scale lifecycle model - is the most cost-effective way forward," Bill explains.

"We use MPDS4 to create the factory layout from the customer's imported 2D plans, adding height attributes to generate a 3D building with internal walls," explains project consultant Alan Liddle. "Our standard steelwork catalogs are then used to re-create the columns and roof trusses in 3D - that's essential to working out the clearance space for new machinery." CAD Schroer imports and uses existing 3D machinery models from suppliers when available, otherwise designs the models for the customer from 2D drawings, then positions them in the building and routes the required conveyors and services, again using standard catalogs.



Special equipment can be modelled based on a "sheet-based modelling" approach, which is easy to learn for regular 2D users.

"Our 3D factory modelling service is also an exercise in quality assurance," Alan explains. "MPDS4 provides integrated hard and soft space interference checking, consistency checking, and rules-based design. That means we can show if large machines can be manoeuvred into place without colliding with other equipment, or if pipework has inadvertently been routed through space vital to the operation and maintenance of other equipment."

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Most customers can tell stories of finding this kind of thing out the hard way when the equipment is delivered and the roof has to be raised or existing machinery moved, causing additional downtime and great expense."

A typical factory producing tens of thousands of units per hour can quickly lose huge amounts of money during unplanned down-times, whether during the installation process, or because of inefficient spatial layouts hampering operator effectiveness. This can be avoided through careful planning in 3D.

### Factory Laser Scanning

A lack of up-to-date drawings is a common problem for older, frequently retrofitted, factories. In such cases, CAD Schroer arranges for its laser scanning partner to scan the factory bay, providing a 3D point cloud for the accurate modelling and positioning of existing piping, steelwork, the roof, and any process equipment that is to remain. CAD Schroer then deletes the redundant equipment, and designs the new line.

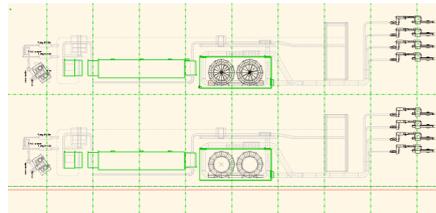
### Step and Repeat

Any equipment models created can be re-used on other projects. "Where customers operate several factories across the country, we often find that we are using the same, or similar, equipment, and that speeds things up even further," Alan explains. Where they are extending existing factories, or building new bays, MPDS4 Factory Layout makes it easy to create 3D concept designs for project meetings. "Initially, it's not important what each machine looks like in detail – the overall layout, which determines the type and cost of the equipment required, is the important starting point," Bill explains. In that case, designers can copy existing plant models from previous projects, adding standard conveyors in a matter of minutes. Designs can be edited and evolved to a point where the plans are presented to management, contractors and suppliers in 3D. Any concept models unique to the new facility can

then be replaced by real models of the actual equipment as soon as sourcing decisions are made.

### Revolutionising Project Reviews

Key for all of CAD Schroer's MPDS4 customers is the ability to use 3D to communicate effectively with project teams and upper management, all of whom need to gain a good understanding of what a new factory or production line will look like, especially



2D views are automatically generated from the virtual factory, and can be dimensioned and annotated as required using the system's 2D drafting functionality.

at eye level.

The Engineering Review walk-through visualisation tool built into MPDS4 comes with eye level controls, which allow users to see across the virtual factory from an operator's point of view, and identify blind spots. With designs that maximise visibility for each operator, planners can minimise the distances staff have to cover to monitor each line, speeding up processing, and making it easy to identify and deal with production problems.

For designers who need to send their 3D factory models to contractors or external clients for feedback, MPDS4 can generate a very compact e-mailable 3D representation of an entire installation. This can be reviewed collaboratively with a simple external tool, which allows users to fly through and query the model, add notes and comments, and then return it to the designer.

### Integrating Downstream Processes

2D drawings of any views can automatically be produced from the 3D factory model for use by site contractors, technical documentation, and maintenance. Detailed parts lists, BOMs and reports are generated on

demand to facilitate procurement and financial control. "We often customise reports for clients, and integrate the output from the factory layout software with existing ERP and PDM systems to ensure an efficient, high quality project engineering process," Bill explains.

### Strategic Flexibility

MPDS4 typically takes a day to implement. A training course typically takes five days. All the standard plant design disciplines - from integrated P&ID software to HVAC ducting and electrical design - are available as add-on software modules, with interfaces to ISOGEN™ for automatic piping isometric production, and to many CAD, analysis, PDM and ERP systems, also available. The system's customisability gives users with unique processes or equipment catalogs the flexibility they need to quickly ramp up design projects. Multi-user and multi-platform ready, it also supports diverse systems strategies.

"But as our work for customers in the process industry is showing, one of the greatest benefits for process engineers is that MPDS4 is backed by CAD Schroer's team of experienced consultants ready to help Owner Operators meet tight project deadlines and budgets, to communicate effectively, and to avoid the expensive mistakes that cost dearly on the construction site," Bill concludes.

■ For more information, and an online factory layout demonstration with audio, please visit [www.cad-schroer.com/factory](http://www.cad-schroer.com/factory)

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