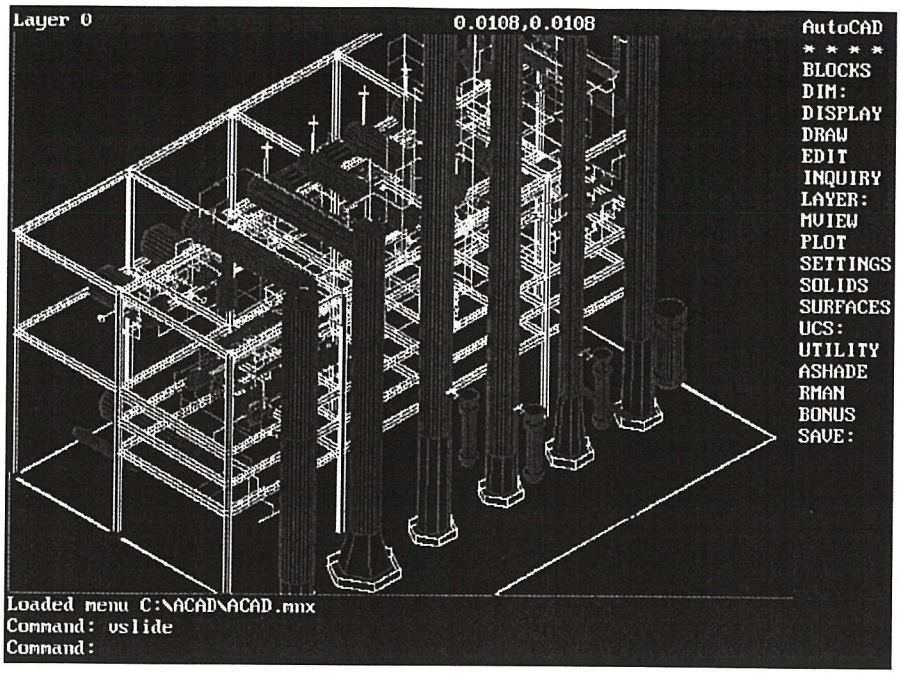
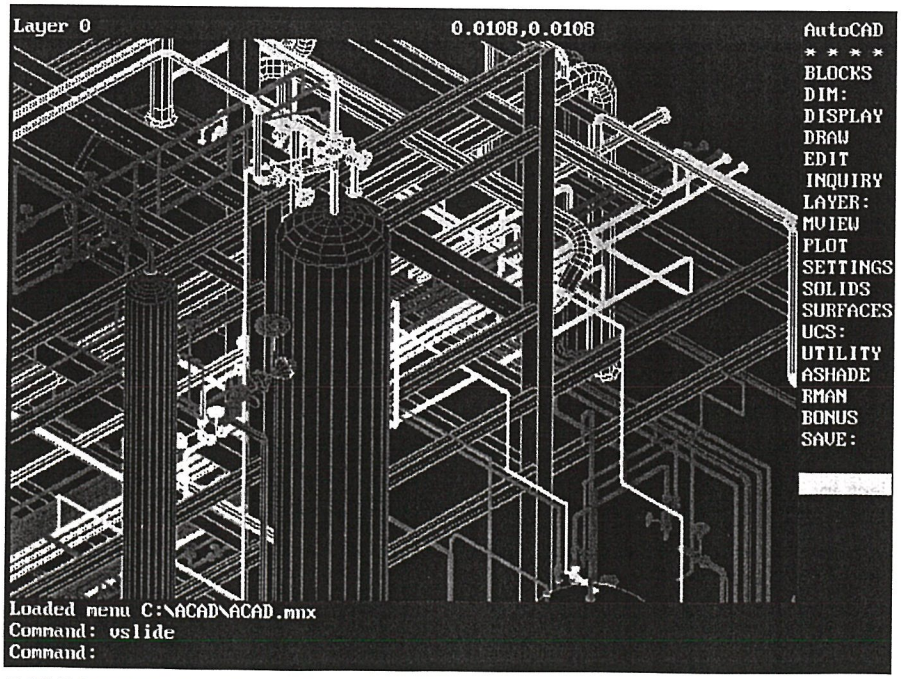
LUCKY STRIKE



The realms of AutoCAD extend to the Far East, where one Korean company used the package with AutoPLANT software in a major North-American project

When Lucky Engineering won a contract to design a 3900-ISO methyl methacrylate and isobutylene plant, they did not think twice about how to approach it. Some while ago, Lucky started to use a new, spec-driven, 3D plant design software package, AutoPLANT from EDA, which works within AutoCAD. Lucky's designers were already familiar with the AutoCAD interface and knew that the package would fit the bill for this project.

Lucky Engineering Company was established in Korea in 1978 as a general engineering and contracting firm, offering a wide range of technical services including feasibility studies and planning, project management, design engineering, procurement, inspection, construction and start-up operations. Since then, the company have evolved into a highly-diversified corporation specialising in process plant design, environmental control, HVAC and clean room, electrical power systems, as well as architectural and civil engineering.



ROLE MODEL: Detail of an AutoCAD 3D model of chemical plant

Striking it lucky

Lucky are a member of the Lucky-Goldstar Group, one of Korea's leading enterprises which own and operate more than 50 plants in a wide range of industries. They became the first Korean engineering firm to take on a major North-American project when it designed a Union Carbide polypropelene plant.

Five years ago, the company installed their first 2D CAD system in an effort to reduce drawing and design time.

In the old days, when manual drafting methods were used, the company's designers typically needed about 150 to 200 hours to produce one typical 30-ISO, A0-sized, orthographic drawing from the P&ID. Each piping section took a staggering 380 hours to complete. On a 3900-ISO plant, the total piping engineering time for this phase of the design would be something on the order of 50,000 hours.

Hands on AutoCAD

Initially, the AutoCAD software was used as an electronic drawing board so essentially the same methods were used as with manual drafting. In order to draw each isometric, the designer needed to deter-

mine the proper perspective carefully and type in detailed bill of materials (BOM) information.

The CAD system proved so successful, that the company decided to take it one step further. After careful assessment of several third-party 3D design systems, Lucky plumped for EDA's AutoPLANT software. When the 3900-ISO project came along, the real benefits of the package came to the fore. The entire plant layout could be produced in 3D right from the start. Rather than simply entering elevation data on the drawing as before, elevation became an integral part of the drawing. The drawing could then be viewed from the front or from any other angle to check clearances and fits.

This simplified the design process to the point that the time required to lay out a typical 30-ISO, A0-section was reduced to a mere 180 hours.

In the fast lane

Once the 3D layout was completed, Lucky were overwhelmed with the improvement in speed in the production of the isometric drawings. All that was required was to define the entities which make up the line and the desired view.

The ability to link textual BOM data such as description or size provided additional time savings. Designers had been freed from the need to enter descriptions on the drawing. Instead, a secretary typed the specifications for each component into a simple, flat-file textual database.

The specific fields used in the database had been selected by Lucky engineers to fit the needs of this project. Whenever a symbol was entered into the drawing, the textual information was automatically linked to the drawing. This information was then used to produce reports such as BOMs, valve and specialty lists, instrument lists and line designation schedules.

AutoPLANT allowed them to manipulate data by separating stainless steel components onto a different report or subtracting the length of in-line components to provide cut-length data. If an error was discovered in a specification, it can be corrected simply by typing the correct data into the database. Every instance of that change in the project was then automatically updated.

The information could also be exported in ASCII, Lotus and dBASE format and, after completion of the project, would be downloaded to the customer's system for administrative use.

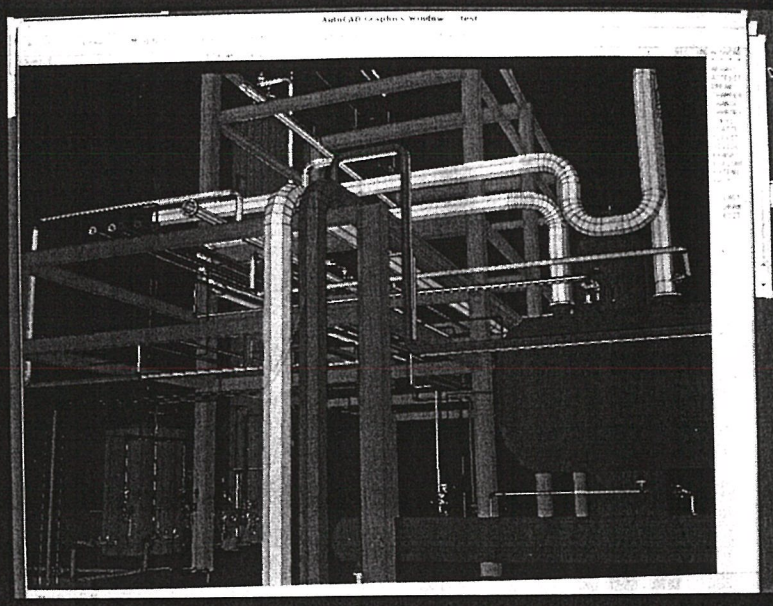
Additional time savings came from linking the orthographics and isometrics — changes only needed to be entered in the orthographic drawings, after which they automatically rippled through the rest of the design system.

Lucky were able to view the entire project in 3D, helping designers to detect interferences and other problems much earlier than would have been possible before. This substantially increased the accuracy of the initial drawings and minimised rework time.

Lucky believe that this ability to determine interference between components will contribute a five per cent reduction in total plant cost due to reduced field rework and better constructability.

The company are extremely pleased with their new investment and have no doubts about the benefits it will bring.

Now, thanks to AutoCAD, AutoPLANT and a stroke of luck, the design of the 3900-ISO project was successfully completed and is currently under contruction in Yeochin, Korea. □



Picture courtesy of Engineering Design Automation

AutoPLANT — Piping

AutoPLANT — Piping is a 3D piping and plant design software package for AutoCAD developed by Engineering Design Automation.

The package features three shells. **P&ID** is an AutoCAD shell for creating intelligent piping and instrumentation diagrams, loop sheets and other flow sheets. The System stores and manipulates non-graphic attributes for piping and equipment, which serve as the basis for drawing annotation and report generation. Standard engineering reports, including Linc List, Instrument Index, Valve List, etc, are automatically extracted from the drawing and available for post processing in Lotus 123, dBase or wordprocessors. P&ID comes with a symbol library of ISA, ASME and TEMA approved components and commonly-used line fonts.

DESIGNER is an expert shell for 3D pipe layout and orthographic production. The system is completely spec driven which is claimed to reduce dimensional errors and insures conformance to standards. Pipe specs are created using Lotus 123. DESIGNER enables the user to visualise the entire plant in 3D and work in four simultaneous views. The BOM function allows generation of material reports from the model, again using Lotus 123 or dBase. A 2D interface to the P&ID program enables checking the design against the schematic. Pipe fabrication drawings are automatically extracted to the ISOMETRICS program for further detailing.

ISOMETRICS is a shell for creating pipe fabrication drawings. The program is spec-driven, using the same Lotus 123 spreadsheets as DESIGNER. You can extract pipe cut lengths, mark numbers, weight calculations and standard reports for purchasing, maintenance and insulation take-off using a powerful BOM feature. Plant co-ordinates can be calculated for each node in the pipe.

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