

EXSYS Case Study

Construction Method and Labor Cost Diagnostics

Construction Contractor

Arc welding is used by various segments of the construction industry and has become an integral part of almost every steel structure. A knowledge automation system was developed that provides cost analysis to help contractors and fabricators in bidding, control and productivity analysis. The system is not only practical for cost estimating, but can be used to study the effect of varying important parameters such as labor rate, labor efficiency, operating factor, and material costs on the total cost.



The system consists of two main modules: The first selects an appropriate welding method based on job characteristics. The second estimates the welding costs based on the selected welding method and the input values supplied by the user. The system can also be used by steel fabricating establishments for preparing detailed project estimates and performing sensitivity analysis to evaluate the impact of varying specific parameters on final welding costs.

The knowledge automation system covers many welding processes such as:

- ◆ Manual
- ◆ Semi-automatic
- ◆ Machine
- ◆ Automatic welding

Project characteristics considered for determining a suitable weld process include:

- ◆ Welding indoors versus outdoors
- ◆ Weld size
- ◆ Quality and appearance
- ◆ Position of work
- ◆ Joint penetration
- ◆ Availability of automatic welding system
- ◆ Dispersion of weld locations

Labor cost, material and consumable cost, and equipment and power cost information were also included in the spreadsheets used by the system.

The knowledge automation system explains why it asks questions and also describes its decision-making process. For example, it explains what is meant by a high versus average quality weld, or what is the relationship of weld penetration with the plate thickness and its effect on welding. System users can evaluate the impact of various factors on the total costs.