**AutoBarSizer – Optimized Cutting of Bars and Rods**

The software AutoBarSizer generates optimized layouts for the cutting of stock items, namely steel profiles (metal beams) and other bars and rods, into shorter pieces. The generated layouts achieve an extremely high degree of material utilization (yield), i.e. the cutting waste is minimized. Furthermore, various configurable constraints are taken into account. The planner can also use different parameters to balance yield and additional organizational effort caused by the reusable remainders produced.

When layouts with miter cuts are created, AutoBarSizer also optimizes the interleaving (nesting) of the parts. For this it is sometimes useful to rotate some of the parts. The planner can allow or forbid specific rotations depending on material symmetries and production requirements. AutoBarSizer solves planning questions not only from rolling mills and steel traders, but also from the woodworking industry and manufacturers of “material strips” of all kinds.

The computation of one common size cutting layout only takes from a couple of seconds up to at most a few minutes.

**Benefits**

The computer based optimization of length combinations for cutting bars and rods leads to the best possible avoidance of waste and can thus save considerable amounts of expensive material. Resources are saved and production costs are decreased without affecting the quality of product or service. By individual assessment of remainders usage and remainders production, AutoBarSizer allows the user to better manage the stock and avoid unnecessary storage costs for remainders.

---

1 Cutting layout with miter cuts, computed by AutoBarSizer.
Features

Parts and stock items
- any number of different parts
- automatic selection from any number of different stock items
- customized specification of limited or unlimited availability of stock items
- identification of remainders among the stock items (for preferred utilization)

Saw features
- front and back trim (non-usable sectors at beginning and end of the stock items)
- saw blade thickness

Miter cut
- profile symmetries that have to be considered when rotating parts for miter cuts
- minimum lengths for trapezoid waste parts between two mitered parts
- any miter square is possible
- orientation of mitered parts (flat or upright)
- labeling of a specific saw side and:
  - choice of the side of the parts that has to be placed at the labeled saw side
  - choice of the side of the stock items that has to be placed at the labeled saw side

Production and usage of remainders
- one- or two-stage remainder evaluation with distinct minimum lengths
- adjustable trade-off between minimization of remainder production, preferred utilization of remainders from the stock, and yield maximization

Software and further development

AutoBarSizer is a compute engine that can be embedded into other applications, e.g. plant control or systems for enterprise resource planning, through an XML-interface. It is available for all current Microsoft Windows operating systems. Alternatively, AutoBarSizer is usable through a file interface or as server application.

Based on the latest research results, Fraunhofer SCAI constantly improves and enhances AutoBarSizer. This is facilitated by the institute’s long-standing experience and wide-ranging knowledge of optimization algorithms. Furthermore, Fraunhofer SCAI reacts to the needs of its customers by delivering new versions with additional features or by developing custom software involving the service portfolio of AutoBarSizer.