COMPUTATIONAL SPEED-UP OF 2D PACKING

Efficient implementation of 2D nesting problem to minimize waste of metal

H2020 SOCIETAL CHALLENGES: Climate Action, Environment, Resource Efficiency and Raw Materials

PRODUCTIVE SECTOR: Materials

PROBLEM DESCRIPTION

Lantek's goal was to find the optimal layout of 2D pieces on a large metal rectangular sheet to minimize the waste material in the sheet cutting through an efficient implementation of 2D nesting problem.

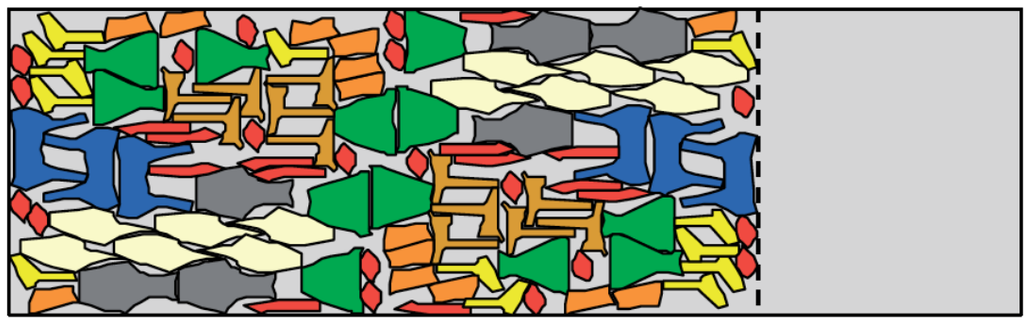
CHALLENGES AND GOALS

To design an efficient algorithm for the 2D nesting (packing) problem and to improve the current by boundary representations in order to develop a software that will speed up computations.

MATHEMATICAL AND COMPUTATIONAL METHODS

A discrete curvature measure was used to find the best match between two objects.

The algorithm is based on D-function and non-fitting polygon approach.



2D nesting problem: the rectangular container is t o be filed by 2D objects t o minimize the waste (grey)

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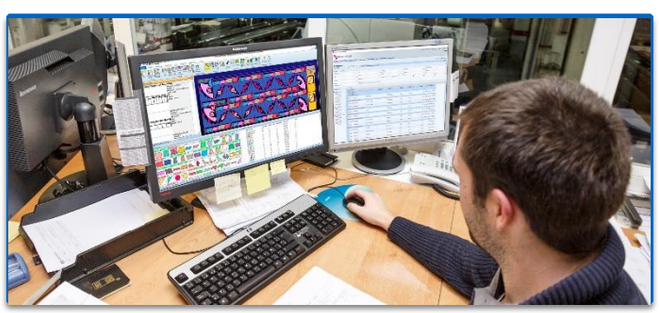
Results and Benefits

The boundary representation of the objects (so far polygons, later NURBS curves) is more efficient for the overlapping test than the pixel-to-pixel comparison of two areas. This allows for a computational speed-up of 2D packing, that will ultimately result in the reduction of the waste of material.

The computational speed-up of 2D packing will ultimately result in the reduction of the waste of material.



Lantek employee working on the Packing software

Lantek headquarters located in the Araba Science and Technology Park

basque center for applied mathematics

lantek