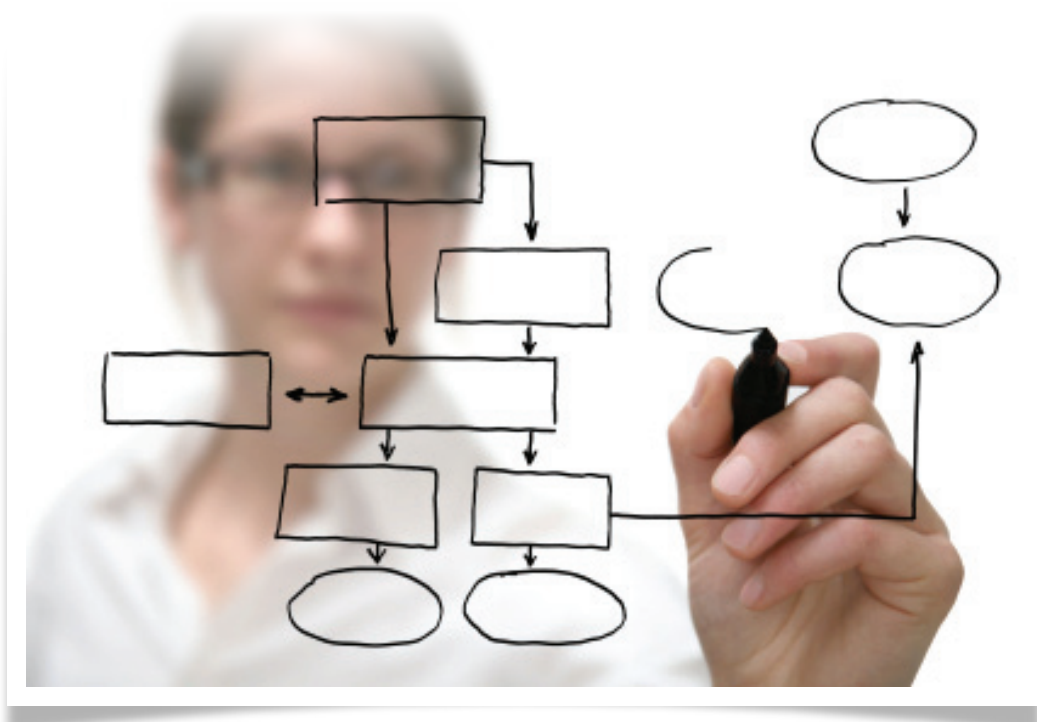


*Optasoft develops a scheduler*  
for Graboplast's PVC floor plant

*Case study*



With the support of AIMMS' robust and flexible platform, Optasoft was able to develop a scheduler that breaks down the period of performing orders.

### Business description & background

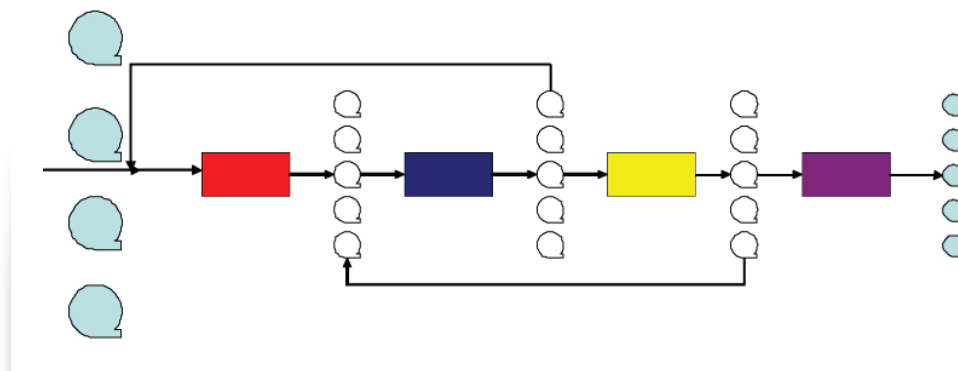
Graboplast ZRt. is a Hungarian company known all over the world of producing PVC floor, parquet, paneling, and special floor products, as well as wallpaper, to the markets, 7% in Hungary. Its income in 2006 was approx. 80 MM EUR, 20% higher increase comparing to 2005, mainly due to development in the strategic floor products such as home floor, sport floor, contract floor, and vehicle floor products. Production of wallpaper is dropped since 2007.

### The challenge

**The management intention was breaking down the period from receiving and order to its fulfillment no more than 10 days without maintaining extensive finished product stock and extended storage facility.**

This intention conflicts with aiming maximal capacity utilization, another target of the management. Floor production is performed on a single production line including special printing devices. Several products are distinguished according to thickness, width, densen (color and pattern), embossing, and ingredients (for stability, hardness, or special surface effects). Changeover time is essential, and is minimized by carefully designing the schedule for maintaining high productivity. One of the operations is performed continuously on a machine, without switch off and on, but significant part of the product loses quality during changeover in that case. This part should also be kept at minimum as much as possible.

**The scheduling problem is full of constraints and difficulty.** The floor is fabricated over a glassy foil net (vlies) obtained in bales of given quality and finite width and length. The floor basis is made first by carrying and fixing material on this foil. Press operations and other treatment operations come later. However, the inter-operation products can be stored in finite length pieces only, in a limited number of storage rolls. Final product is cut and stored on rolls of a different length; and the orders are not usually coincide with the length pieces conform with the bale lengths. Any bale should be worked up in a single operation on the first machine. The production is of a branching shape in the sense that some inter-operation semiproducts can become different products in later operations. Different products go through the machines in different operation sequences. Some machines perform several operations. Moreover, a few products visit the same machine second time or even the third time after visiting other machines, during their production, according to the actual recipe. The changeover time and the expected amount of decreased quality product depends on the products and the sequence of products.



## The solution

The technological constraints and their relations to the business targets were deeply considered in a series of consultations. For mathematical formulation, hazy and conflicting operation sequence preferences had to be re-considered by the plant management, and unambiguous preferences were discussed.

The task was to maintain high productivity and low percentage of decreased quality products whereas provide short lead time. A compromise is made by scheduling the vlies bale work-ups in a way that provides short lead time and then sorting the unique operations according to product properties like width, thickness, densen, etc. Mathematical programming is used for designing batch sizes and bale sequence, and mathematical programming is used to decide on the best sequence of product groups in the down-stream operations. However, the product groups are defined according operation sequence preferences suggested by the plant management. Several such preference structures had been tried and checked before the final version of the model was accepted.

**The software is easy to operate**, reaches the headquarter (another city) of the company to fetch the orders electronically from a data base, checks its consistency and conformity with the technological data base, and provides information on the necessary material orders beside the optimal schedule. **It produces the optimal schedule, in a few minutes, in the same form the shop floor managers used to deal with in an earlier system (MS Excel sheets and printouts), and maintains an internal data system storing the technological data not stored in the company's ERP.** The shop floor manager can modify the data base, and can even define new properties and new products with novel recipes. The manager can judge over the schedule and modify it in a graphical interface; in that case the software checks the feasibility of the interactively designed new schedule and provides suggestions for producing a feasible solution.

**OptaFloor 1.0**

Fájl Ütemezés Adatok Navigálás

Főlap Reaktív ütemezés lap

**Géphiba miatti reaktív ütemezés**

Rendelkezésre állási idők:

Hiba időpontja:

Ütemezés kezdete: 2008. május

Látható terv határ:

H	K	Sze	Cs	P	Szo	V
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

Ma: 2008. 05. 14.

Művelet adatai:

Kezdete: 2007 03.22. 17:59

Vége: 2007 03.22. 22:19

Gyártási diszpozíciósám: 3120587

Diszpozíció: 3120587 Lépés: AJ

Padlóalap: PA400 Cikkszám: 99209

Minta: 4173 Színállás: 254

Bála adatai:

Kezdete:

Vége:

Üvegfátyol:

Padlóalap:

Gyártási diszpozíciósám:

Graboplast Rt

Input adatok

Output adatok

Automatikus ütemezés lap

Interaktív ütemezés lap

Optasoft  
A BIZTOS MEGOLDÁS

OptaFloor.prj | Act.Case: [eset1OPT2] READY



### Customer Quote

*"In the beginning I could not guess what a help this product could be in our work. Now much shorter time we spend with production scheduling, and the results are sure if the data are OK."*

Tamás Szatmári, Graboplast ZRt.

### About AIMMS

Paragon Decision Technology is the developer of AIMMS, the modeling tool of choice for professionals when developing optimization-based decision support applications or components. **It is used by leading companies worldwide in a wide range of industries** in areas such as supply chain management, energy management, production planning, logistics, forestry planning, warehouse management, and risk-, revenue-, and asset- management.

AIMMS is a registered trademark of Paragon Decision Technology B.V.  
In March 2006, Optasoft and Paragon signed an AIMMS Service Partnership Agreement.  
Optasoft - Distribution and supply chain optimization

**Internet: [www.aimms.com](http://www.aimms.com) • E-mail: [info@aimms.com](mailto:info@aimms.com)**

### About Optasoft

OptaSoft Research and Development Ltd., founded in 2004, undertakes **research and development of mathematical models and unique software products** for optimally solving distribution, supply chain management, production scheduling, and logistic problems of middle and large scale industrial and financial companies. The team of Optasoft specializes in fast solution development, based on AIMMS.

**Internet: [www.optasoft.hu](http://www.optasoft.hu) • E-mail: [lelkes@optasoft.hu](mailto:lelkes@optasoft.hu)**



H-1117 Budapest, Bölcső utca 5. III/b  
Phone/fax: +36 1 209 76 52  
Mobile: +36 20 491 96 71  
E-mail: [zoltan.lelkes@optasoft.hu](mailto:zoltan.lelkes@optasoft.hu)  
[www.optasoft.hu](http://www.optasoft.hu)