

Wednesday, April 03, 2013

WoodWisdomNet+ Ideas for cooperation

## **Facility layout problem in forest based industries**

Transportation distances in production facilities in forest based industries usually are very large and cause high movement costs. This proposal aims at developing an iterative simulation based optimization approach in order to minimize transport time and distances in industries. This will further reduce waiting times for loading and unloading trucks and empty movements of stackers which supply various facilities at the production site.

Our proposal not only focuses on loading and unloading operations by road and rail but also considers internal movements at the production site. Our goal is to model a scalable approach for optimizing production layout in forest based industries. The project will develop a standardized material flow analysis to determine material movements of various kind. In a second step we computationally rearrange the facility layout in order to optimize the transport moves and distances. For a fixed layout simulation is further applied to disclose inventory levels and empty movements of transportation resources.

## **New sorting principles at logyards and its effects on the upstream supply chain**

As far as we know there is no reliable and efficient classification scheme available that allows sorting round timber according to strength parameters. Currently sorting of round logs is done by various diameter classifications. As a consequence, when producing sawn wood for glue-laminated timber products there are no special cutting strategies at sawmills for this type of semi-finished goods. For cutting round logs the current cutting process considers cutting patterns that simply maximize the output of sawn wood, but it is not known what kind of patterns allow a strength maximizing cutting strategy and what kind of sawing technology is needed for these new kind of cutting patterns. Furthermore, it is not known where to place cost efficient quality measurements during the production process.

Additionally, in current practice the strength measurement is only done after the cutting process.

This project proposal considers this research question and one of its goals is to find the best possible cutting patterns to allow a strength maximizing cutting strategy. Furthermore, a classification scheme for sorting round logs shall be developed that considers strength related parameters at its storage locations. With this features in mind an analysis of required sawing technology for allowing the usage of such new cutting patterns is performed and the impact of such modifications of the production process is shown. This shall be compared to the current practice.

Therefore, a simulation of the material flow shall be developed that is used for comparing various sorting classifications and set-ups of sawing technologies. The places for quality measurements shall be investigated and shall be the basis for a cost-benefit analysis. The results shall show an optimized classification scheme for round timber. It can be assumed that due to the proposed approach sawn wood of higher quality for producing glue-laminated lumber is resulted, because cutting patterns are not focusing on maximizing output, but on strength related quality properties. The described new modifications for sorting and their effects shall be valued for cost effectiveness. Additionally, a cost-benefit analysis shall be calculated to show the impact of a strength related sorting scheme.

