**OBJECTIVE**

Our objective is to minimize the project duration of mold manufacturing process by considering precedence relations between tasks and the resource capacities of the factory.

**KAREL KALIP**

Karel Kalip is a mold manufacturer for the automotive industry with an active R&D center. Mold design is a complex process which involves roughly 1200 components. At Karel Kalip, these components are partially manufactured in-house, partially purchased, and partially subcontracted.

**OUR MATHEMATICAL MODEL**

\[ x_{ik} = 1 \text{ if the task } i \text{ finishes at time } t \text{ and uses resource } k \]

\[ 0 \text{ elsewhere} \]

\[ \text{Minimize } \sum_{t=\text{EFT}_i}^{LFT_i} t \cdot x_{ik} \]

\[ \text{s.t. } \]

\[ \sum_{k=1}^{m} \sum_{t=\text{EFT}_i}^{LFT_i} x_{ik} = 1 \]

\[ \text{for } i=1......n \]

\[ \sum_{k=1}^{m} \sum_{t=\text{EFT}_i}^{LFT_i} t \cdot x_{ik} \leq \sum_{t=\text{EFT}_j}^{LFT_j} t \cdot x_{jk} - d_j \]

\[ \text{for all } (i,j) \in A \]

\[ \sum_{i=1}^{n} \sum_{t=\text{EFT}_i}^{LFT_i} \min \{ t+d_j-1, \text{LFT}_i \} r_{ik} \cdot x_{ik} \leq a_k \]

\[ \text{For } k=1......m, t=1......T \]

\[ x_{it} \in \{0,1\} \text{ for } i=1......n \text{ and } t=\text{EFT}_i...LFT_i \]

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**CONCLUSION**

At the end of this project, our aim is to minimize the make span of the mold manufacturing process in order to determine the optimal schedule of the design process of mold manufacturing by using the output of our mathematical model for manufacturing process.