Assumption: Bi and Bk are the last and first batches from PO11 and PO12, respectively, to be produced directly behind each other at every production line. As PL, PO11 takes silo A and PO12 takes silo B. For illustration, also PO B is considered, to be produced on the same PL.

Set of transport chains that cannot run in parallel.

Note that this restriction may correspond to a different silo, i.e., the transport and silo are not a fixed pair.

Transport and silo representation:
- When finished plus \( t^* \)-wait
- When started plus \( t \)
- Starts immediately when previous starts
- After loaded in truck in case PO11 and PO12 correspond to different trips
- Only active for originally different POs if capacity allows

Each block with curved corners represents one production line of a certain type.

Possibly a time penalty representing an 'overdraai'-action.
\[ \bar{t}_{l_1, l_2, u, i} = (1 - c_{\theta_1, \theta_2}) \cdot (\bar{t}_{u, j} + \bar{t}_{l_1, l_2, u, j}^+) + c_{\theta_1, \theta_2} \cdot \min_{l = 1, \ldots, \kappa; \begin{array}{c} c_{\theta_1, \theta_2} = 0, \\ j \in M_1 \end{array}} \left( \bar{t}_{l_1, l_2, u, j} + \sum_{z=1}^{\bar{t}_{l_1, l_2, u, j}} \bar{t}_{z, u, j} \right). \]

search for a non-contaminating feasible PO \( l \) with minimum completion time between POs \( l_1 \) and \( l_2 \)
Realized Schedule:
Optimized Schedule:
Solved for 180 seconds, 23 minutes earlier finished (7.5%)
Efficiency gain:
Comparison to realized schedules for 257 instances (5h) when solving for 180 seconds