

CONTENT

Introduction.....	11
1. Modeling of production flow.....	13
1.1. Purpose of the exercise	13
1.2. Description of the problem/process	13
1.3. Used objects/tools	13
1.4. Structuring of the model	15
1.4.1. Structuring of the model – Applying <i>ParallelStation</i> object.....	15
1.4.2. Structuring of the model – Applying <i>AssemblyStation</i> object.....	16
1.4.3. Structuring of the model – Applying <i>Conveyor</i> and <i>TransferStation</i> objects	16
1.4.4. Structuring of the model – Applying <i>FlowControl</i> object and <i>SankeyDiagram</i> tool.....	18
1.4.5. Structuring of the model – Model the work of employees.....	18
1.5. Assumptions for the performance of the simulation.....	19
2. Mapping material flows in a production processes	21
2.1. Purpose of the exercise	21
2.2. Description of the problem/process	21
2.3. Used objects/tools	21
2.4. Structuring of the model	23
2.4.1. Structuring of the production process model – Basic objects	23
2.4.2. Structuring of the production process – Process flow	24
2.5. Assumptions for the performance of the simulation.....	28
2.6. Guidelines for the analysis.....	28
3. Modeling manufacturing of bulk and liquid products.....	31
3.1. Purpose of the exercise	31
3.2. Description of the problem/process	31
3.3. Used objects/tools	31
3.4. Structuring of the model	33
3.4.1. Structuring of the manufacturing process model – Basic objects	33
3.4.2. Structuring of the manufacturing process model – Adding <i>Tank</i> and <i>Mixer</i> object	34
3.4.3. Structuring of the manufacturing process model – Adding discrete objects and conveyors.....	36
3.5. Assumptions for the performance of the simulation.....	38
3.6. Guidelines for the analysis.....	38

4. Modeling production of fluid products. Fluid library	39
4.1. Purpose of the exercise	39
4.2. Description of the problem/process	39
4.3. Used objects/tools	40
4.4. Structuring of the model	40
4.5. Assumptions for the performance of the simulation	44
4.6. Guidelines for the analysis	44
5. Modeling failures in the production processes	45
5.1. Purpose of the exercise	45
5.2. Description of the problem/process	45
5.3. Used objects/tools	45
5.4. Structuring of the model – Basic objects	45
5.4.1. Structuring of the model – Basic settings parameters for failures	47
5.5. Assumptions for the performance of the simulation	48
5.5.1. Assumptions for the performance of the simulation – Machine maintenance	48
5.5.2. Assumptions for the performance of the simulation – Machine availability	49
5.5.3. Assumptions for the performance of the simulation – Tool change	50
5.6. Guidelines for the analysis	50
6. Using the Resource analysis tools to analyze production processes	51
6.1. Purpose of the exercise	51
6.2. Description of the problem/process	51
6.3. Used objects/tools	51
6.4. Structuring of the model	51
6.4.1. Structuring of the manufacturing process model – Characteristics of the facilities <i>CostAnalyzer</i> and <i>EnergyAnalyzer</i>	53
6.4.2. Structuring of the manufacturing process model – Methods implementation	53
6.4.3. Structuring of the manufacturing process model – Adding basis model	54
6.5. Assumptions for the performance of the simulation	56
6.5.1. <i>Energy analyzer</i>	56
6.5.2. <i>Cost analyzer</i>	57
6.6. Guidelines for the analysis	57
6.6.1. Analysis of the electricity consumption	57
6.6.2. Cost analysis	58
7. Optimization of the company's assortment – quantity production plan	59
7.1. Purpose of the exercise	59
7.2. Description of the problem/process	59
7.3. Used objects/tools	59
7.4. Structuring of the model	60
7.4.1. Building a production model – Construction of a production area with the set of basic characteristics	60
7.4.2. Building a production model – Setting the characteristics of the production plan	61
7.4.3. Building a production model – Defining basic parameters of the production process	62
7.4.4. Building a production model – Setting the limitation of the availability of the machine working time fund	63
7.4.5. Building a production model – Defining the method of determining the income from the implementation of a given production program	63

7.5. Assumptions for the performance of the simulation.....	64
7.6. Guidelines for the analysis.....	65
8. Using assembly line balancing to improve production processes.....	67
8.1. Purpose of the exercise	67
8.2. Description of the problem/process	67
8.3. Used objects/tools	68
8.4. Structuring of the model	69
8.4.1. Structuring of the manufacturing process model – Making a table of processing times	69
8.4.2. Structuring of the manufacturing process model – Mapping the manufacturing process	71
8.4.3. Structuring of the manufacturing process model – Adding objects representing workplace	71
8.4.4. Structuring of the manufacturing process model – Building a system for gathering information.....	71
8.5. Assumptions for the performance of the simulation.....	73
8.6. Guidelines for the analysis.....	74
9. Using the U-shaped structure to improve the production line	75
9.1. Purpose of the exercise	75
9.2. Description of the problem/process	75
9.3. Used objects/tools	76
9.4. Structuring of the model	77
9.5. Assumptions for the performance of the simulation.....	78
9.6. Guidelines for the analysis.....	79
10. Using the Bottleneck Analyzer tool to identify bottlenecks	81
10.1.Purpose of the exercise	81
10.2.Description of the problem/process	81
10.3.Used objects/tools	81
10.4.Structuring of the model	83
10.4.1. Structuring of the manufacturing process model – Basic objects	84
10.4.2. Structuring of the manufacturing process model – Machine failure settings.....	85
10.4.3. Structuring of the manufacturing process model – Shift schedule and employees....	86
10.4.4. Structuring of the manufacturing process model – Lockout zone	87
10.5.Assumptions for the performance of the simulation.....	87
10.6.Guidelines for the analysis.....	88
11. Using the Experiment Manager tool to improve production processes.....	89
11.1.Purpose of the exercise	89
11.2.Description of the problem/process	89
11.3.Used objects/tools	90
11.4.Structuring of the model	91
11.4.1. Building a production process model – Picking a potato pallet from the warehouse and their transport to the production line.....	92
11.4.2. Building a production process model – Cutting, frying and salting fries	93
11.4.3. Building a production process model – Packing in bags and packing in collective packages	93
11.4.4. Building a production process model – Transport of finished products to the warehouse.....	94

11.5. Assumptions for the performance of the simulation.....	95
11.6. Guidelines for the analysis.....	96
12. Using the Experimenter tool to improve the production processes.....	97
12.1. Purpose of the exercise	97
12.2. Description of the problem/process	97
12.3. Used objects/tools	98
12.4. Structuring of the model	99
12.5. Assumptions for the performance of the simulation.....	101
12.6. Guidelines for the analysis.....	101
13. Using the GAWizard tool in improving the production processes	103
13.1. Purpose of the exercise	103
13.2. Description of the problem/process	103
13.3. Used objects/tools	105
13.4. Structuring of the model	107
13.4.1. Structuring of the production process model – Creation of flow objects and defining variables	107
13.4.2. Structuring of the production process model – Lenses hardening process	107
13.4.3. Structuring of the production process model – Adding workers.....	108
13.4.4. Structuring of the production process model – Use of methods.....	109
13.5. Assumptions for the performance of the simulation.....	111
13.6. Guidelines for the analysis.....	111
14. Using the Optimizer tool to improve the production processes.....	113
14.1. Purpose of the exercise	113
14.2. Description of the problem/process	113
14.3. Used objects/tools	115
14.4. Structuring of the model	115
14.4.1. Structuring of the production process model – Basic objects	115
14.4.2. Structuring of the production process model – Creation of flow objects.....	117
14.4.3. Structuring of the production process model – Working week schedule	120
14.5. Assumptions for the performance of the simulation.....	120
14.6. Guidelines for the analysis.....	120
15. Building a production process model.....	123
15.1. Purpose of exercise	123
15.2. Description of the problem/process	123
15.3. Used objects/tools	123
15.4. Structuring of the model	125
15.5. Assumptions for the performance of the simulation.....	126
15.6. Guidelines for the analysis.....	127
16. Simulation of the manufacturing process in the automotive industry using computer game Production Line – Car Factory	129
16.1. Purpose of the exercise	129
16.2. Description of the problem/process	129
16.3. Used objects/tools	129
16.4. Structuring of the model	130
16.4.1. Structuring of the manufacturing process model – Choice of production line location	131

16.4.2. Building of the manufacturing process model – Key workstations	131
16.4.3. Building of the manufacturing process model – Enabling flow between stations	132
16.4.4. Structuring of the manufacturing process model – Attachment of material resources.....	132
16.4.5. Building of the manufacturing process model – Additional functions.....	133
16.5. Assumptions for the performance of the simulation.....	133
16.6. Guidelines for the analysis.....	133
List of tables.....	135
List of figures	137