Fitting out machinery for reference change in a hosiery plant: A DES approach

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Research practice 3

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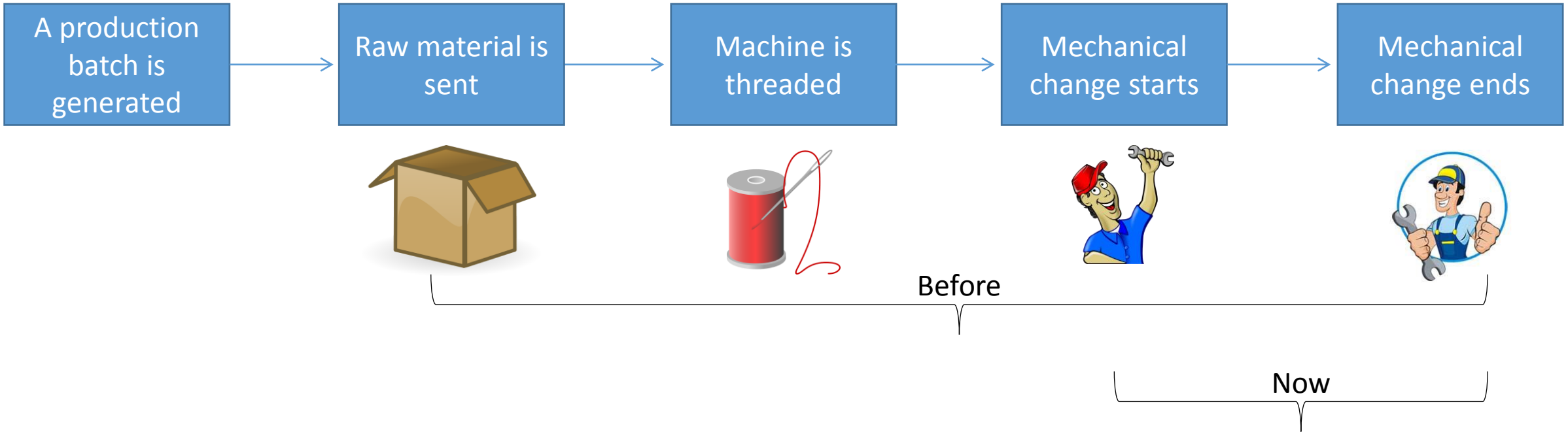
General objective

Implement a discrete event simulation model for the process of fitting out machinery for reference change in a knitting plant using Simul8.

Changing references – Data picking



Process

- Change parts of the machine
- Develop a program
- Establishes measures
- Test the machine
- Validate samples

Variables

- Technology
- Resource
- Tissue type
- Change type

Data picking – Changes in each corridor

Corridor	Percentage
1	11.65%
2	11.09%
3	10.18%
4	9.94%
5	8.58%
6	8.37%
7	7.93%
8	7.63%
9	7.17%
10	7.13%
11	3.55%
12	3.43%
13	3.35%

Data picking – Tissue type

Tissue type	Percentage
Smooth	59.44%
Half sandwich towell	25.48%
Sandwich towell	8.71%
Corrugated	2.85%
Links Links	2.05%
Links-Jacquard	0.33%
Jacquard	0.30%
Terry towel	0.25%
Others	0.60%

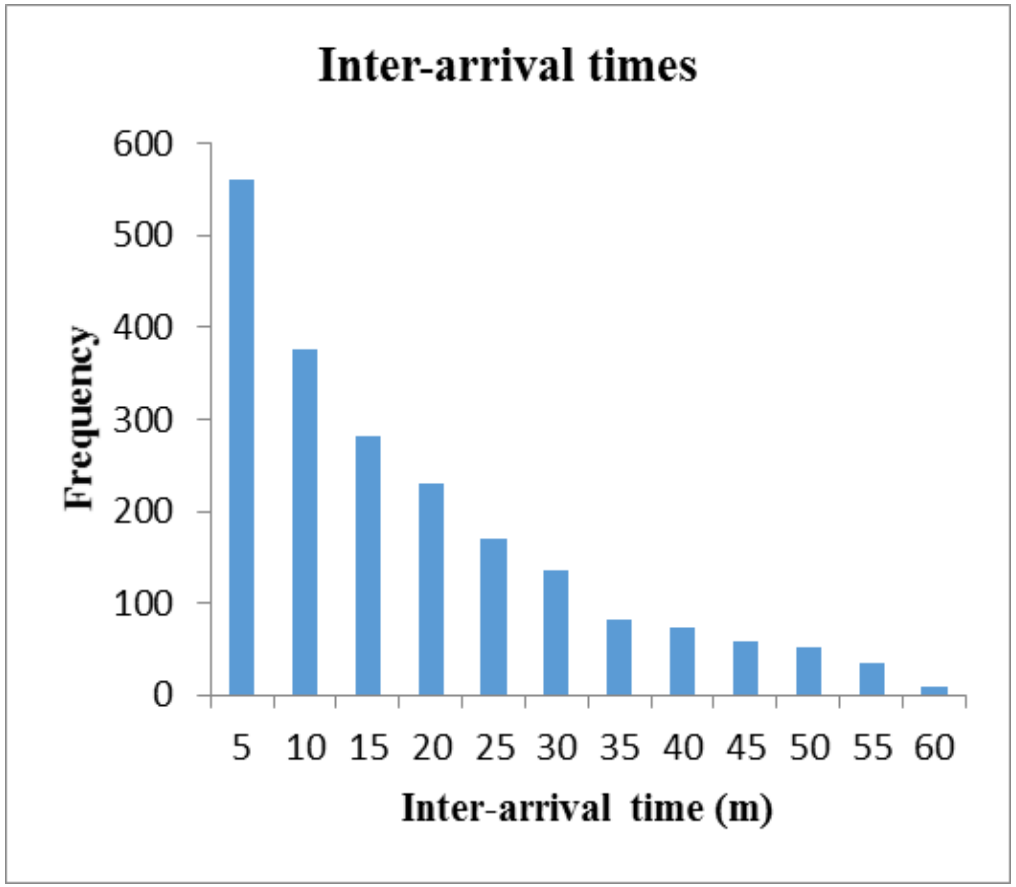
Data picking – Change type

Change type	Percentage
Repetition	78.88%
New resource developed	9.41%
Resource change	8.61%
New	3.10%

Categories

Category	Change type	¿Previous tissue type = Current tissue type?	Percentage
1	Repetition	True	54.83%
2		False	24.05%
3	New resource developed	True	6.97%
4		False	2.44%
5	Resource change	True	6.36%
6		False	2.25%
7	New	True	2.26%
8		False	0.83%

Inter-arrival times



Scenarios

- Scenario 1: Considers the distribution of changes in the corridors as in the real system

- Scenario 2: Assumes that the changes and mechanics are distributed equally in all corridors

- Scenario 3: Assumes that there are not Categories 5 or 6, that is, all references that have been produced have the program developed in the assigned resource, becoming repetitions. Also retains the distribution of mechanical as in Scenario 2.

- Scenario 4: Assumes that there are not Categories 7 or 8, that is, all references that have not been produced before in the plant, have the program developed in the assigned resource, becoming new resource developed. Also retains the distribution of mechanical as in Scenario 2.

Utilization of the staff in each corridor

Corridor	Average	
Scenario	1	2
1	92.49%	73.08%
2	90.47%	73.04%
3	89.79%	73.01%
4	89.20%	73.12%
5	80.76%	74.17%
6	79.22%	73.25%
7	76.58%	72.47%
8	73.45%	72.28%
9	69.25%	72.51%
10	68.61%	72.19%
11	35.55%	72.11%
12	35.04%	71.95%
13	33.91%	72.91%

Time in system

Category	Average time in system (min)
1	589.09
2	610.36
3	677.12
4	913.45
5	847.73
6	1014.51
7	778.38
8	918.02

Time in system for four Scenarios

Scenario	1	2	3	4
Minimum time in system (min)	24.13	23.09	20.73	22.07
Average time in system (min)	592.36	453.06	425.57	442.98
Maximum time in system (min)	2649.35	2108.31	2007.76	2078.67

Gantt chart

Reference: 1219

		03/01/2015																								04/01/2015																							
REFERENCE	MACHINE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
121983TP	4335			QUEUE						CR				PRODUCTION																																					
121983TP	4338																									QUEUE												CR				PRODUCTION									

Thanks for your attention