**Promodel Job Process Example**

Una empresa química produce un compuesto industrial. El compuesto se vende en paquetes de 6 contenedores y dos aplicadores. El compuesto se fabrica a partir de una base de materia prima. Diez barriles de la base de materia prima llegan cada mañana. La base de materia prima se procesa a través de un separador. El tiempo de procesamiento para el proceso de separación sigue la distribución normal del registro con una media de 45 minutos y una desviación estándar de 10 minutos. Al final del proceso, se producen diez galones del compuesto de cada barril. El compuesto se almacena en un contenedor especial de capacidad de 100 galones.

El siguiente paso en el proceso es llenar el compuesto en un recipiente de 1 galón. Los contenedores vacíos llegan en lotes de 100 cada mañana. Los contenedores vacíos se almacenan en un contenedor que puede contener 100 contenedores. El tiempo requerido para el proceso de llenado de un contenedor con un galón de compuesto sigue una distribución uniforme entre 2.7 y 3.3 minutos. Los contenedores llenos se almacenan en un área con una capacidad de 100 contenedores. La máquina de llenado es propensa a descomponerse. El tiempo entre fallas sigue una distribución exponencial con una media de 200 horas. El tiempo requerido para reparar la máquina sigue una distribución normal con una media de 5 horas y una desviación estándar de 1 hora.

Luego, seis contenedores se empaquetan en una sola caja con dos aplicadores. El tiempo de procesamiento para la operación de embalaje sigue una distribución triangular con un límite inferior de 2 minutos, un límite superior de 5 minutos y el valor más probable de 3 minutos. Los aplicadores se compran a un proveedor en lotes de 500 unidades cada tres semanas.

Desarrollar un modelo de simulación Promodel para el proceso de producción. Ejecutar la simulación durante 15 semanas con calentamiento de 60 horas. Analice el proceso y determine cómo se puede aumentar la producción a lo largo. Supongamos 40 horas por semana.

**Overview of simulation model**

|  |  |
| --- | --- |
| Entities | Raw\_base, Compound, Empty container, Full container, Applicator, Six-pack box |
| Arrivals | Raw-base, empty containers, applicator |
| Locations | Storage for raw-base, compound, empty & filled containers and applicators, Separator, filling machine, and box packager |
| Performance measures | production throughput, bottle-neck operation |

**Promodel Layout**

Raw\_Base\_ Storage

Capacity = 10

Arrival

Entity = Raw\_Base

Frequency =8 hr, Qty = 10

Separator

Units= 1, Cap.= 1

Service time: L(45,10) min

First 1

Compound\_Storage

Capacity = 100

Filing machine

Units= 1, Cap.= 1

Service time: U(3,.3) min

DT = e(200) hr

E\_Container\_Storage

Capacity = 100

Exit

Arrival

Entity = E\_Container

Frequency =8 hr, Qty = 100

First 1

Join 1

F\_Container\_Storage

Capacity = 100

First 1

Arrival

Entity = Applicator

Frequency =120 hr, Qty = 500

Applicator\_Storage

Capacity = 500

Box\_Packager

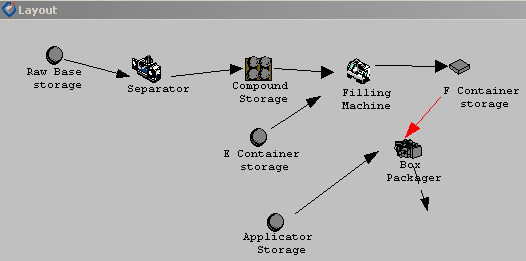
Units= 1, Cap. = 6

Service time: T(2,3,5) min

Join 1

First 1

First 10

****

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* Locations \*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Name Cap Units Stats Rules Cost

------------------------ --- ----- ----------- ---------- ------------

Raw\_Base\_storage 10 1 Time Series Oldest, ,

Separator 1 1 Time Series Oldest, ,

Compound\_Storage 100 1 Time Series Oldest, ,

Filling\_Machine 1 1 Time Series Oldest, ,

E\_Container\_storage 100 1 Time Series Oldest, ,

F\_Container\_storage 100 1 Time Series Oldest, ,

Box\_Packager 6 1 Time Series Oldest, ,

Applicator\_Storage 500 1 Time Series Oldest, ,

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* Clock downtimes for Locations \*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Loc Frequency First Time Priority Scheduled Disable Logic

----------------- ------------ ------------ ------------ --------- ------- -----------

Filling\_machine e(200) hr 99 No No Wait N(5,1) hr

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* Entities \*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Name Speed (fpm) Stats Cost

---------------- ------------ ----------- ------------

Raw\_Base 150 Time Series

Compound 150 Time Series

F\_Container 150 Time Series

Six\_Pack\_Box 150 Time Series

E\_Container 150 Time Series

Applicator 150 Time Series

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* Processing \*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Process Routing

Entity Location Operation Blk Output Destination Rule

----------- -------------------- ------------------ ---- ----------- -------------------- ------

Raw\_Base Raw\_Base\_storage 1 Raw\_Base Separator FIRST 1

Raw\_Base Separator Wait L(45, 10) min 1 Compound Compound\_Storage FIRST 10

Compound Compound\_Storage 1 Compound Filling\_Machine JOIN 1

E\_Container E\_Container\_storage 1 E\_Container Filling\_Machine FIRST 1

E\_Container Filling\_Machine Join 1 Compound

Wait U(3,.3) min 1 F\_Container F\_Container\_storage FIRST 1

F\_Container F\_Container\_storage 1 F\_Container Box\_Packager FIRST 1

Applicator Applicator\_Storage 1 Applicator Box\_Packager JOIN 1

F\_Container Box\_Packager Combine 6

Join 2 Applicator

WAIT T(2, 3, 5) MIN 1 Six\_Pack\_Box EXIT FIRST 1

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* Arrivals \*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Entity Location Qty Each First Time Occurrences Frequency Logic

---------- ------------------ ---------- ---------- ----------- ---------- ------------

Raw\_Base Raw\_Base\_storage 10 INF 8 hr

E\_Container E\_Container\_storage 100 0 INF 8 hr

Applicator Applicator\_Storage 500 0 INF 120 hr

**Results: Locations**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Capacity | Total Entries | Avg Time Per Entry (MIN) | Avg Contents | Maximum Contents | Current Contents | % Utilization |
| Raw Base storage | 10 | 751.4 | 206.3 | 4.3 | 10.0 | 4.3 | 43.1 |
| E Container storage | 100 | 7481.0 | 154.7 | 32.2 | 100.0 | 13.8 | 32.2 |
| Applicator Storage | 500 | 2729.4 | 3293.8 | 249.7 | 500.0 | 240.4 | 49.9 |
| Separator | 1 | 748.1 | 45.0 | 0.9 | 1.0 | 1.0 | 93.6 |
| Compound Storage | 100 | 7474.2 | 90.3 | 18.7 | 82.8 | 7.0 | 18.7 |
| Filling Machine | 1 | 7468.2 | 3.2 | 0.7 | 1.0 | 0.7 | 66.8 |
| F Container storage | 100 | 7467.8 | 0.2 | 0.0 | 2.0 | 0.0 | 0.0 |
| Box Packager | 6 | 7471.9 | 14.5 | 3.0 | 6.0 | 2.5 | 50.2 |

**Results: Location States Multi**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Name | Scheduled Time (HR) | % Empty | % Part Occupied | % Full | % Down |
| Raw Base storage | 600 | 14.9 | 84.3 | 0.9 | 0 |
| E Container storage | 600 | 32.8 | 66.1 | 1.1 | 0 |
| Applicator Storage | 600 | 1.1 | 98.6 | 0.2 | 0 |
| Compound Storage | 600 | 27.5 | 72.1 | 0.3 | 0 |
| F Container storage | 600 | 95.9 | 4.1 | 0.0 | 0 |
| Box Packager | 600 | 13.7 | 74.8 | 11.5 | 0 |

**Results: Location States Single**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Scheduled Time (HR) | % Operation | % Setup | % Idle | % Waiting | % Blocked | % Down |
| Separator | 600 | 93.3 | 0.0 | 6.4 | 0.0 | 0.3 | 0.0 |
| Filling Machine | 600 | 41.5 | 0.0 | 30.5 | 25.4 | 0.0 | 2.7 |

**Results: Failed Arrivals**

|  |  |  |
| --- | --- | --- |
| Entity Name | Location Name | Total Failed |
| Raw Base | Raw Base storage | 2.6 |
| E Container | E Container storage | 62.7 |
| Applicator | Applicator Storage | 56.2 |

**Results: Entity activity**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Total Exits | Current Qty In System | Avg Time In System (MIN) | Avg Time In Move Logic (MIN) | Avg Time Waiting (MIN) | Avg Time In Operation (MIN) | Avg Time Blocked (MIN) |
| Raw Base | 0.0 | 5.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| E Container | 0.0 | 14.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Applicator | 2489.0 | 240.4 | 3677.3 | 0.0 | 0.0 | 0.0 | 3677.3 |
| Compound | 7467.2 | 7.0 | 342.8 | 0.0 | 0.0 | 44.9 | 297.8 |
| F Container | 7467.0 | 2.5 | 170.6 | 0.0 | 12.4 | 2.0 | 156.2 |
| Six Pack Box | 1244.9 | 0.0 | 3.3 | 0.0 | 0.0 | 3.3 | 0.0 |

**Summary of results**

**Inventory**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Avg Contents | How many six-packs |  |
| Raw Base storage | 4.3 | 4.3 x 10/6 = 7.16 boxes | **Throughput = 1244.9 boxes** |
| E Container storage | 32.2 | 32.2/6 = 5.4 boxes |
| Applicator Storage | 249.7 | 249.7/2 = 124.8 boxes |
| Compound Storage | 18.7 | 18.7/6 = 3.1 boxes |
| F Container storage | 0.0 | 0 |

**Machine utilization**

|  |  |
| --- | --- |
| Name | % Operation |
| Separator | 93.3 |
| Filling Machine | 41.5 |
| Box Packager | % Full = 11.5% |

Raw\_Base\_ Storage

Capacity = 10

Arrival

Entity = Raw\_Base

Frequency = 8 hr, Qty = 10

Capacity = 600/8 x 10 = 750

Separator

Units = 1, Cap. = 1

Service time: L(45,10) min

Capacity = 600/.75 = 800

First 1

Compound\_Storage

Capacity = 100

Filing machine

Units = 1, Cap. = 1

Service time: U(3,.3) min

DT = e(200) hr

Capacity = 600 x 60/3 = 12,000

E\_Container\_Storage

Capacity = 100

Exit

Arrival

Entity = E\_Container

Frequency = 8 hr, Qty = 100

Capacity = 600/8 x 100 = 7500

First 1

Join 1

F\_Container\_Storage

Capacity = 100

First 1

Arrival

Entity = Applicator

Frequency = 120 hr, Qty = 500

Capacity = 600/120 x 500 = 2500

Applicator\_Storage

Capacity = 500

Box\_Packager

Units = 1, Cap. = 6

Service time: T(2,3,5) min

Capacity = 600 x 60/3 = 12,000

Join 1

First 1

First 10

Actual =751.4

Actual in =748.1

Actual in =7474.2

Actual =7467

Actual in =7481

Actual in =2729.4

Actual out = 1245

Actual in =7471.9

Actual in =7468.2

Actual in =2489

**Flowchart analysis**

**Analysis for increasing the production rate to 1500**

Actual in =7467.8

**Bottleneck computation**

**Arrival of materials**

|  |  |  |  |
| --- | --- | --- | --- |
| Entity Name | Arrival parameter | Capacity for 600 hours | Capacity in 6 packs |
| Raw Base | 10 barrels/8hour | (600 hours/8 hours) x 10 = 750 barrels | (750 br. x 10 gallons)/6 = 1250 boxes |
| E Container | 100 per 8 hour | (600 hours/8 hours) x 100 = 7500 units | 7500/6 = 1250 |
| Applicator | 500 per 120 hours | (600 hours/120 hours) x 500 = 2500 units | 2500/2 = 1250 |

**Machine capacities**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Production rate | Capacity for 600 hours | Capacity in 6 packs |
| Separator | 10 gallons/45 minutes | (600/.75 ) x 10 = 8000 gallons | 8000/6 = 1333.33 boxes |
| Filling Machine | 1 gallon/3 minutes | (600 hr. x 60 min)/3 = 12,000 | 12,000/6 = 2,000 boxes |
| Box Packager | 1 box/3 minutes | (600 hr. x 60 min)/3 = 12,000 | 12,000 boxes |

**Summary**

At the current production rate, arrivals of all the three materials are at bottle neck. The capacity of the production process is limited by the Separator to 1,333 boxes.

**Possible changes needed for increasing throughput to 1500 boxes**

**Arrivals**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Requirement for 1500 boxes | Current capacity | Deficit | No. of batches/15 weeks | Deficit/batch  (Qty each) |
| Raw Base | 1500 x 6 gallons/box = 9000 gallons/10 gallons per bbl. = 900 bbl. | (600 hours/8 hours) x 10 = 750 barrels | 150 bbl. | 15 weeks x 40 hrs./8 hrs. = 75 | 150/75 = 2 bbl. |
| E Container | 1500 x 6 containers/box = 9000 containers | (600 hours/8 hours) x 100 = 7500 units | 1500 units | 15 weeks x 40 hrs./8 hrs. = 75 | 1500/75 = 20 units |
| Applicator | 1500 x 2 = 3000 units | (600 hours/120 hours) x 500 = 2500 units | 450 units | 15 weeks x 40 hrs./120 hrs. = 5 | 450/5 = 90 units |

**Machine capacities**

|  |  |  |  |
| --- | --- | --- | --- |
| Name | Requirement for 1500 boxes | Capacity for 600 hours | Action needed |
| Separator | 1500 boxes x 6 gallons/10 gallons per batch = 900 batches or 9000 gallons | (600/.75 ) x 10 = 8000 gallons or 800 batches | Need to run 100 more batches  Time per batch = 600x60/900 = 40 minutes/batch |
| Filling Machine | 1500 boxes x 6 containers = 9000 containers | (600 hr. x 60 min)/3 = 12,000 containers | No action needed |
| Box Packager | 1500 boxes | (600 hr. x 60 min)/3 = 12,000 boxes | No action needed |

**Promodel - Line production**

Green Grass, Inc. a manufacturer of garden equipment wants to design an assembly line for the production of fertilizer spreader to meet demand estimated to be about 2400 units per week (40 hours/week). Information about the production process is given in the following table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Work element** | **Description** | **Mean time (sec)** | **Assume Uniform distribution for time (sec)** | **Predecessors** |
| A | Bolt leg frame to hopper | 40 | 36 - 44 | None |
| B | Insert impeller shaft | 30 | 25 - 35 | A |
| C | Attach axle | 50 | 44 - 56 | A |
| D | Attach agitator | 40 | 32 - 48 | B |
| E | Attach drive wheel | 6 | 4 - 8 | B |
| F | Attach free wheel | 25 | 21 - 29 | C |
| G | Mount lower post | 15 | 11 - 19 | C |
| H | Attach controls | 20 | 17 - 23 | D, E |
| I | Mount nameplate | 18 | 14 - 22 | F, G |

The theoretical assembly line to produce at the rate of 2400 units per week, given in page 324 is reproduced below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Station** | **Work elements** | **Cumulative time (Sec)** | **Idle time (sec)** |
| S1 | A | 40 | 20 |
| S2 | C | 50 | 10 |
| S3 | B, F | 55 | 5 |
| S4 | D, G | 55 | 5 |
| S5 | E, H, I | 44 | 16 |

Develop a ProModel simulation for the above production line. Run the simulation for 1-week of operation (40 hours). Let the warm-up period be equal to 10 hours. Repeat simulation 10 times.

**Overview of simulation model**

|  |  |
| --- | --- |
| Entity | Parts |
| Arrival | Parts |
| Locations | Parts storage, 5 stations |
| Performance measures | Idle time at work stations, WIP level, production throughput |

Parts Storage

Capacity = Inf

Arrival

Entity = Parts

Frequency =8 hr, Qty = 300

Station 1

Units= 1, Cap.= 1

Service time: U(40,4) sec

First 1

Station 2

Units= 1, Cap.= 1

Service time: U(50,6) sec

Station 3

Units= 1, Cap.= 1

Service time: U(30,5) sec;

U(25,4) sec

Station 4

Units= 1, Cap.= 1

Service time: U(40,8) sec;

U(15,4) sec

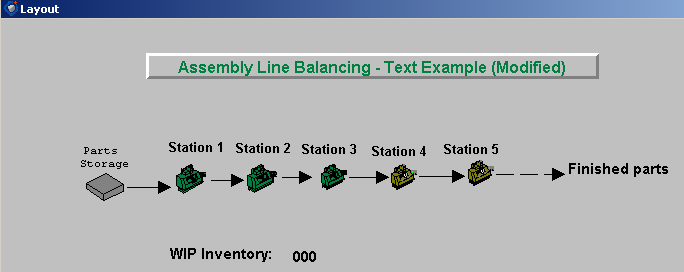
Station 5

Units= 1, Cap.= 1

Service time: U(6,2) sec;

U(20,3) sec; U(18,4) sec

Exit



\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* Locations \*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Name Cap Units Stats Rules Cost

---------------------- --- ----- ----------- ---------- ------------

Station1 1 1 Time Series Oldest, ,

Station2 1 1 Time Series Oldest, ,

Station3 1 1 Time Series Oldest, ,

Station4 1 1 Time Series Oldest, ,

Station5 1 1 Time Series Oldest, ,

Parts\_Storage INF 1 Time Series Oldest, ,

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* Entities \*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Name Speed (fpm) Stats Cost

------------- ------------ ----------- ------------

Parts 150 Time Series

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* Processing \*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**Process Routing**

Entity Location Operation Blk Output Destination

------------- ---------------------- ------------------ ---- ------------- ----------

Parts Parts\_Storage Inc WIP 1 Parts Station1

Parts Station1 Wait U(40,4) Sec 1 Parts Station2

Parts Station2 Wait U(50,6) Sec 1 Parts Station3

Parts Station3 Wait U(30,5) Sec

Wait U(25,4) Sec 1 Parts Station4

Parts Station4 Wait U(40,8) Sec

Wait U(15,4) Sec

1 Parts Station5

Parts Station5 Wait U(6,2) Sec

Wait U(20,3) Sec

Wait U(18,4) sec

DEC WIP 1 Parts Exit

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* Arrivals \*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Entity Location Qty Each First Time Occurrences Frequency Logic

--------- ---------------------- ---------- ---------- ----------- ---------- --------

Parts Parts\_Storage 300 0 INF 8 hr

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* Variables (global) \*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ID Type Initial value Stats

------------- ------------ ------------- -----------

WIP Integer 0 Time Series

**Locations**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Capacity** | **Total Entries** | **Avg Time Per Entry (MIN)** | **Avg Contents** | **Maximum Contents** | **Current Contents** | **% Utilization** |
| Station1 | 1 | 2498.8 | 0.96 | 1 | 1 | 1 | 100 |
| Station2 | 1 | 2498.8 | 0.96 | 1 | 1 | 1 | 100 |
| Station3 | 1 | 2498.8 | 0.96 | 1.00 | 1 | 1 | 99.76 |
| Station4 | 1 | 2498.8 | 0.92 | 0.95 | 1 | 1 | 95.37 |
| Station5 | 1 | 2498.7 | 0.73 | 0.76 | 1 | 0.8 | 76.34 |
| Parts Storage | 999999 | 3273.9 | 384.80 | 524.91 | 901.2 | 776.1 | 0.05 |

**Location States**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **% Operation** | **% Setup** | **% Idle** | **% Waiting** | **% Blocked** | **% Down** |
| Station1 | 69.3 | 0 | 0 | 0 | 30.7 | 0 |
| Station2 | 86.7 | 0 | 0 | 0 | 13.3 | 0 |
| Station3 | 95.4 | 0 | 0.2 | 0 | 4.4 | 0 |
| Station4 | 95.3 | 0 | 4.6 | 0 | 0.1 | 0 |
| Station5 | 76.3 | 0 | 23.7 | 0 | 0 | 0 |

**Entity Activity**

|  |  |
| --- | --- |
| **Name** | **Total Exits** |
| Parts | 2497.9 |

**Variables**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Total Changes** | **Avg Time Per Change (MIN)** | **Minimum Value** | **Maximum Value** | **Current Value** | **Avg Value** |
| WIP | 5497.9 | 0.44 | 154.1 | 905.9 | 780.9 | 529.6 |