Module 1 – Practice Solutions

Atlas Inc

AI1.

Capacity of Worker 1 = 60/50 = 6/5 = 1.2 units/min

Capacity of Worker 2 = 60/60 = 1 unit/min

Capacity of Worker 3 = 60/30 = 2 units/min

Capacity of Worker 4 = 60/45 = 1.33 units/min

Capacity of Worker 5 = 60/40 = 1.5 units/min

Bottleneck = Worker 2

AI2.

Capacity of assembly line = capacity of bottleneck = 1 unit/min * 60 min/hr = 60 units/hr

AI3.

Utilization = flow rate/capacity = 1 unit/min / 60/45 units/min = 45/60 = 0.75

AI4.

Avg labor utilization = labor content / (labor content + idle time) = 225 sec / (225 sec + 75 sec) = 225/300 = 0.75

AI5.

Direct labor cost = total wages per hour / flow rate per hour = ($15 * 5)/60 = $1.25/unit

Airline Check-in

AC1. Inventory = Flow rate x Flow time

35 passengers = 255 passengers/hr x H hrs

H = 35/255 = 0.13725 hrs x 60 min/hr = 8.2 min

Joe's Beer, Bait & Tackle

JBBT1.

365/5.5=66.36

JBBT2.

$3,200,000/(365/5.5)=$48,219

Process Analysis with Multiple Flow Units

PA1.

Demand per hour: A, 5 units/hr; B, 6.25 units/hr; C, 7.5 units/hr

Resource	**Capacity (min/hr)**	**Workload for A, B, C (min/hr)**	**Total workload (min/hr)**	**Implied utilization**
1	120	25+31.25+37.5	93.75	78%
2	120	20+25+37.5	82.5	69%
3	60	60+0+0	60	100%
4	60	0+18.75+22.5	41.25	69%
5	120	30+37.5+30	97.5	81%

Resources 3 and 4 have equal capacity, but the implied utilization for Resource 3 is higher. Therefore the bottleneck is Resource 3.

PA2.

Since none of the resources has an implied utilization higher than 100%, this process is demand-constrained. The flow rate for each product is: A, 5 units/hr (40 units/day); B, 6.25 units/hr (50 units/day); C, 7.5 units/hr (60 units/day).