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**Course Number: MMA 841**

**Course Name: Ops and Supply Chain Analytics**

**Assignment Name: Assignment 2**

**Due Date: Aug 30, 2024 11:59 pm**

**Team Name: Team Gordon**

|  |  |
| --- | --- |
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**Additional Comments:**

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# Question 1:

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Below are the calculations I used to calculate the capacities at each stage of the process.

**Clerk Capacity** = (# of employees x Hours per day x 60)/application processing time (min)  
**Clerk Capacity** = (5x8x60)/10 = 240 applications

**Residential Review (<$1K) Capacity** = (# of employees x Hours per day x 60)/application processing time (min)

**Residential Review (<$1K) Capacity** = (12x8x60)/10 = 192 applications

**Residential Review (>$1K) Capacity** = (# of employees x Hours per day x 60)/application processing time (min)  
**Residential Review (>$1K) Capacity** = (15x8x60)/30 = 160 applications

**Commercial Application** **Capacity** = (# of employees x Hours per day x 60)/application processing time (min)  
**Commercial Application** **Capacity** = (20x4x60)/90 = 53 applications

**Electrical Application** **Capacity** = (# of employees x Hours per day x 60)/application processing time (min)  
**Electrical Application** **Capacity** = (24x5x60)/60 = 120 applications

**Approval** **Capacity** = (# of employees x Hours per day x 60)/application processing time (min)  
**Approval** **Capacity** = (8x3x60)/10 = 144 application

1b.

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Looking at each stage of the application process the bottle neck is at the commercial application stage, with a capacity of **53 applications per day.**

**Clerk** 240 applications per day

**Residential Review (<$1K)** 192 applications per day

**Residential Review (>$1K)** 160 applications per day

**Commercial Application** 53 applications per day

**Electrical Application** 120 applications per day

**Approval** 144 applications per day

1c.

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The electrician’s utilization is 88.4%, meaning that 88.4% of the electricians available capacity is being used to process applications each day.

**Electrician Utilization** = Flow Rate/ Capacity \* 100

**Electrician Utilization** = (106.08/120) = 84.4%

## 2a. A table with numbers and text Description automatically generated

Looking at all the capacities of each step of the hub process. Each machine center will need to produce 6 hubs, totaling to **12 hubs per hour** for both centers. This will help in making sure there is no bottle neck.

**Calculations:**

**Center 1 and 2 Capacity** = Hubs per hour\*Maintenance time

**Center 1 and 2 Capacity** = 12\*0.5(30 min) = 6 hubs per hour

**Finishing Capacity** = Hubs per hour /Unit Processing Time

**Finishing Capacity** = 60/4 = 15 hubs per hour

**Packaging Capacity** = Hubs per hour /Unit Processing Time

**Packaging Capacity** = 60/2 = 15 hubs per hour

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The optimal batch size for center 2 is **40 hubs** before maintenance is required. With new center 2 being able to produce larger bath sizes, which means fewer maintenance interruptions, leading to more efficient use.

**Calculations:**

**Center 1**

**New processing time** = 5 \* 0.4 = 3 min

**Units Processed** = 10

**Maintenance time** = 240 min

**Center 2**

**New processing Time** = 6 min per hub

**Maintenance Time** = 240 min

**Units Processed** = Maintenance Time/ Unit New processing Time

**Units Processed** = 240/6 = **40 Units Processed**