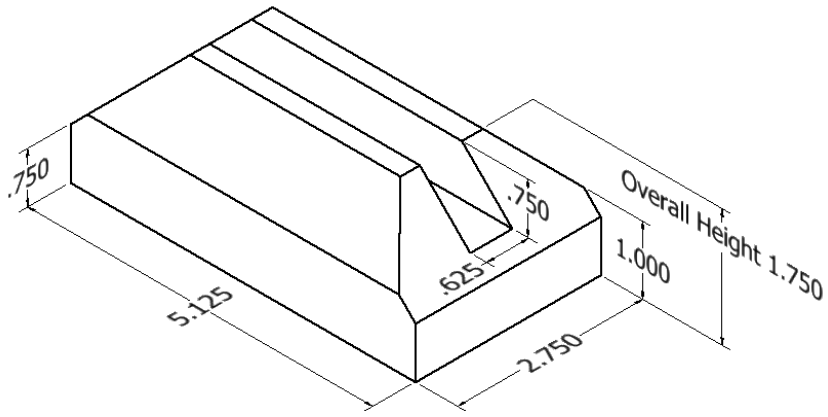
Activity 2.1.2 Mass Properties Analysis Worksheet

Procedure

3. Answer the following questions using model 1.

Model	Properties
 Note: 1) Overall Height = 1.75 2) All Chamfers are 45° 3) Slot is Centered on Part *Model 1 – Slotted Angle Block*	Model Material: • Mild Steel (Steel, Mild) Material Properties • Density: 0.284 • Mass: 5.121 lb • Volume:18.059 • Surface Area: 52.081

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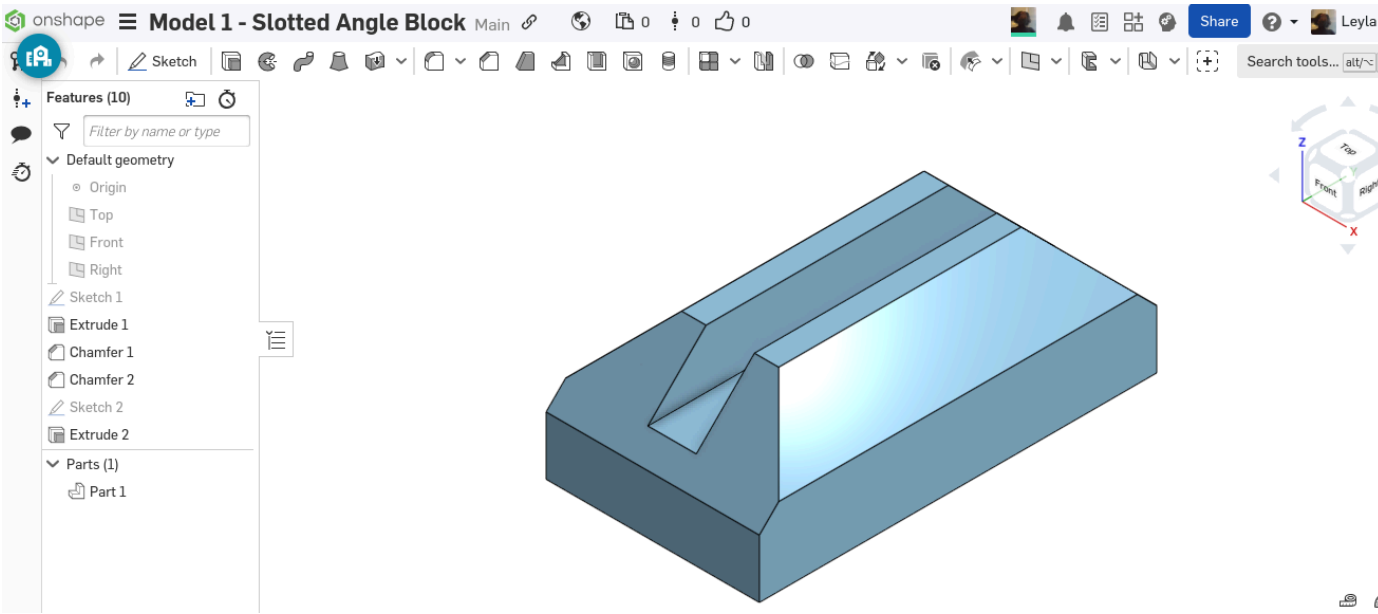


a. What is the material cost of the part assuming that the cuttings are remelted and the cost of mild steel is $6.25 per pound? What is the material cost of the part assuming that the cuttings are not remelted?

Assuming that the cuttings are melted and the cost of the carbon steel is $6.25 per pound the cost of the material would be $32. Assuming that the cutting parts are not melted the cost of the part would be $43.71.

b. What is the mass of the material lost in a typical machining process?

The mass of the material loss in a typical machining process is 1.874 lb

c. What is the cost of the lost material based on your calculations above?

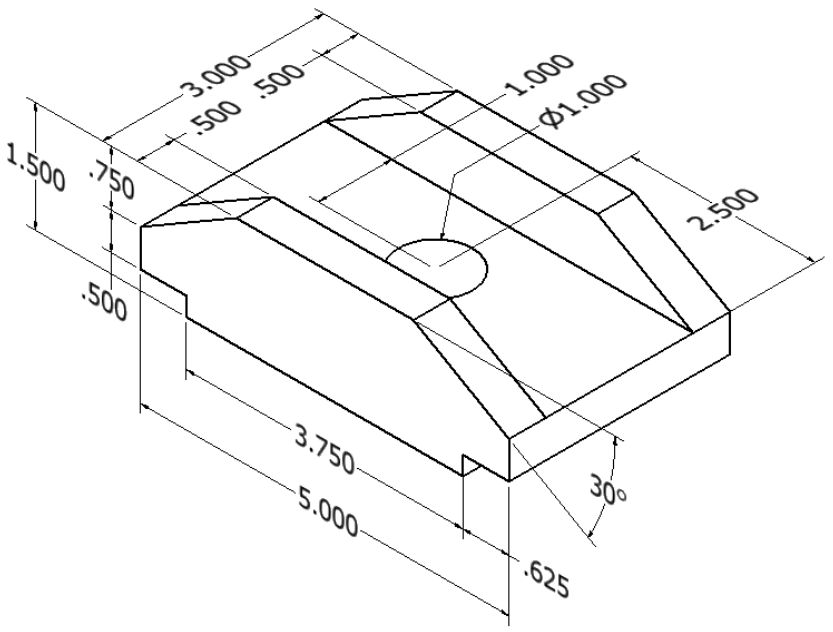
The cost of the lost material based on my calculation is $11.71

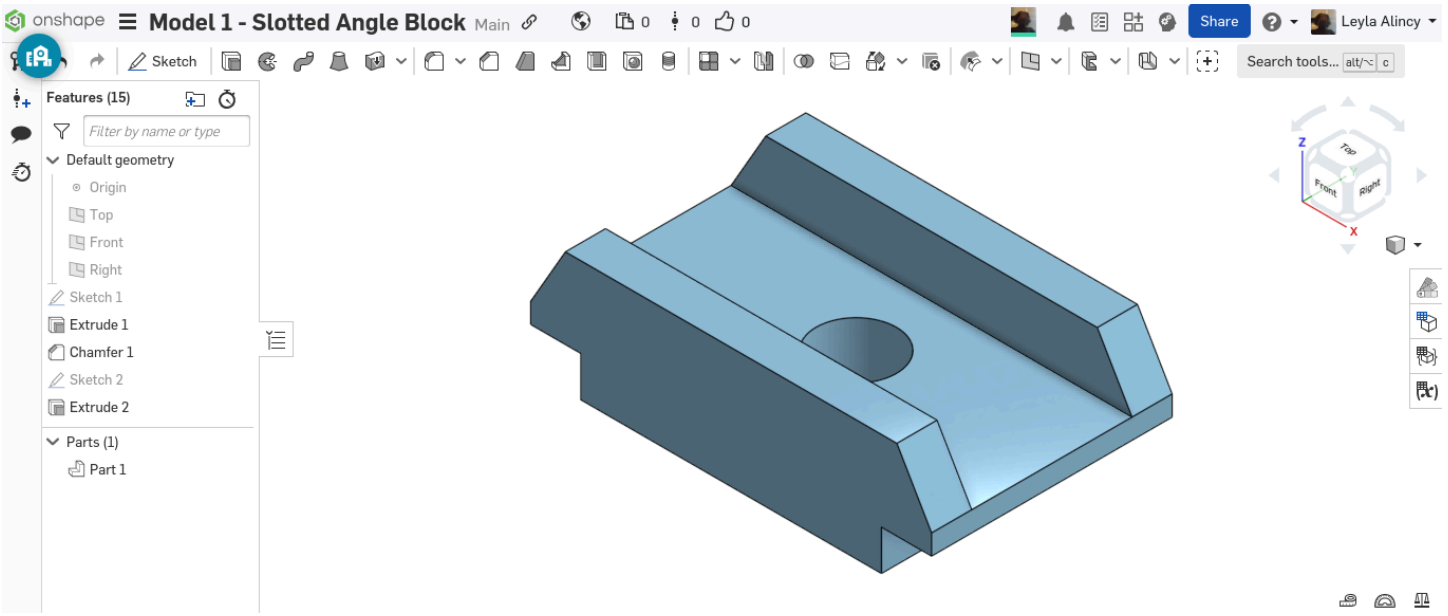
d. What will the volume of the box (in cubic feet) need to be in order to ship 1000 parts packed without spacers?

The wolume of the boc (in cubic feet) needs to be 1504.92 cubic feet in order to ship 1000 parts without spacers.

e. What other processes could be used to create the same part?

Other processes that could be used to create the same part are assembled by putting each piece individually..

Model	Properties
 *Model 2 – Mounting Bracket*	Model Material: Stainless Steel Material Properties Density: 0.279 Mass: 3.406 lb Volume: 12.211 in^3 Surface Area: 56.102 in^3



4. Answer the following questions using model 2

   a. What is the mass of the material lost in a typical machining process?

   The mass of the material lost in a typical machining process is 2.869 lb

b. What is the cost of the lost material based on your calculations above if the cost of stainless steel is $15.75 per pound?

The cost of the material lost if the cost of the stainless steel is $15.75 based on my calculations is $45.19

c. What is the material cost of the part assuming that the cuttings are remelted? What is the material cost of the part assuming that the cuttings are not remelted?

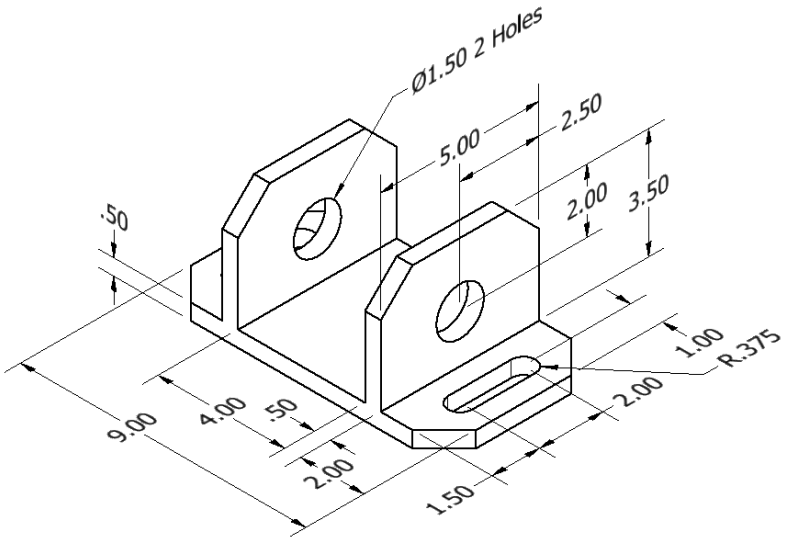
Assuming that the cuttings are melted the cost of the part would be $53.64. The material cost of the part assuming that the cutting are not melted is $98.83

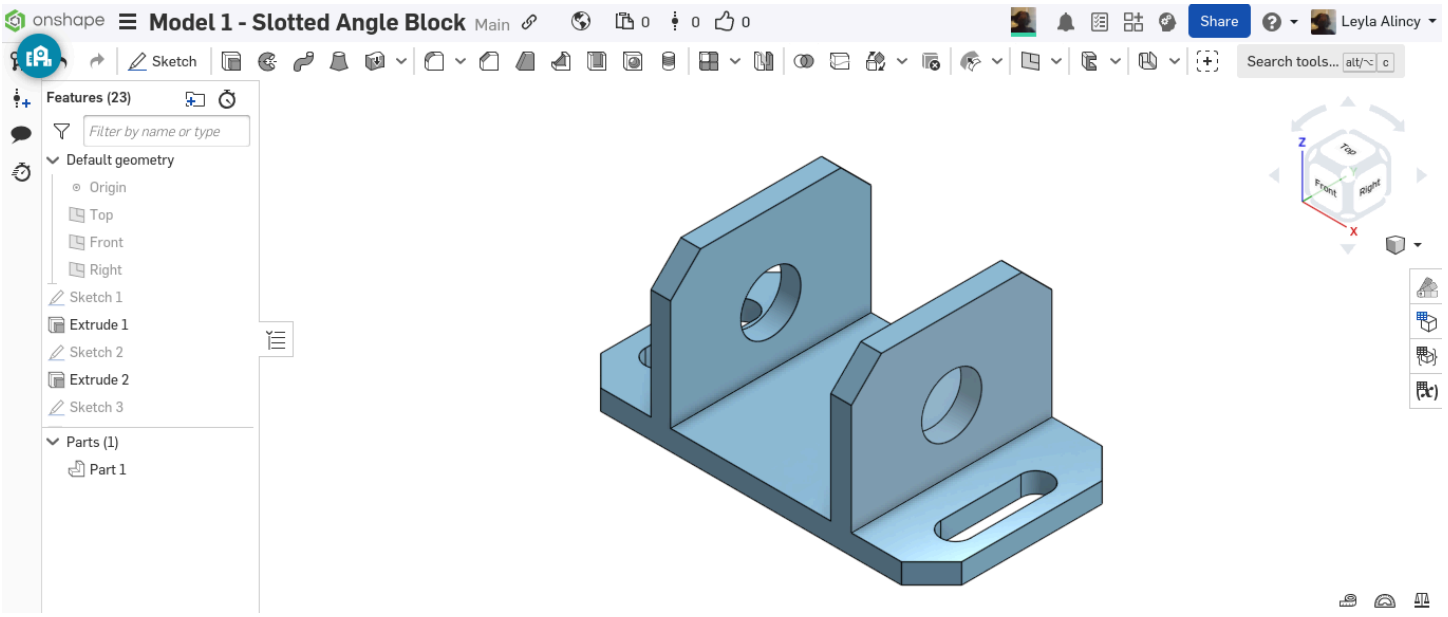
d. What is the cost to ship 1000 parts if current shipping costs are $3.75 per pound?

The cost to ship 1000 part if current shipping cost are 3.75 per pound is $12,772.50

e. What other processes could be used to create the same part?

I would use the additive process to create the same part by adding each part by themselves like robot parts or lego parts.

Model	Properties
 Notes: Chamfers are 1" by 1" Typical Slots on both sides *Model 3 – Support Bracket*	Model Material: Aluminum 6061 Material Properties Density: 0.098 Mass: 3.456 lb Volume: 35.166 in3 Surface Area: 170.975 in2 1.187ft2



5. Answer the following questions using model 3.

   a. What is the material cost of the part assuming that the cuttings are remelted and the cost of aluminum 6061 is $0.62 per pound? What is the material cost of the part assuming that the cuttings are not remelted?

      Assuming that the cuttings are melted and the cost of the aluminum 6061 is $0.62 per pound the cost of the material would be $2.15. Assuming that the cutting parts are not melted the cost of the part would be $10.97.

   b. What is the mass of the material lost in a typical machining process?

      The aterial lost in a typical machining process is 14.23 lb

   c. What is the cost of the lost material based on your calculations above?

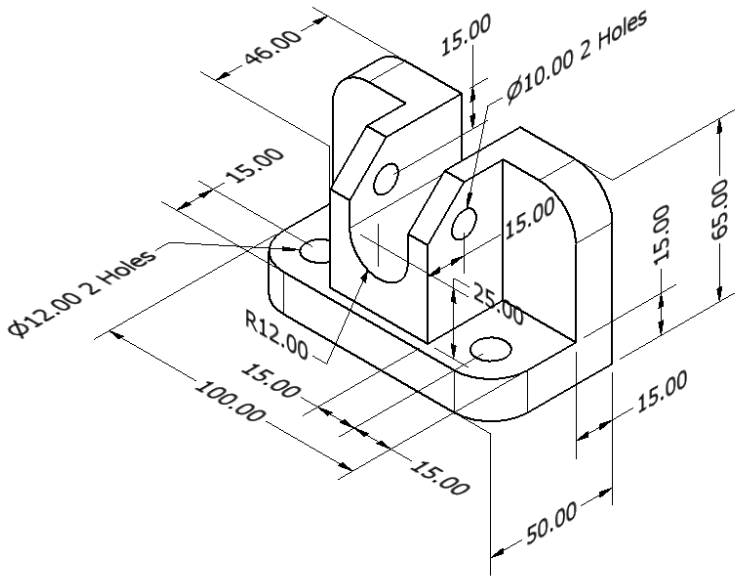
      The cost of the lost material based on my calculations is $8.82

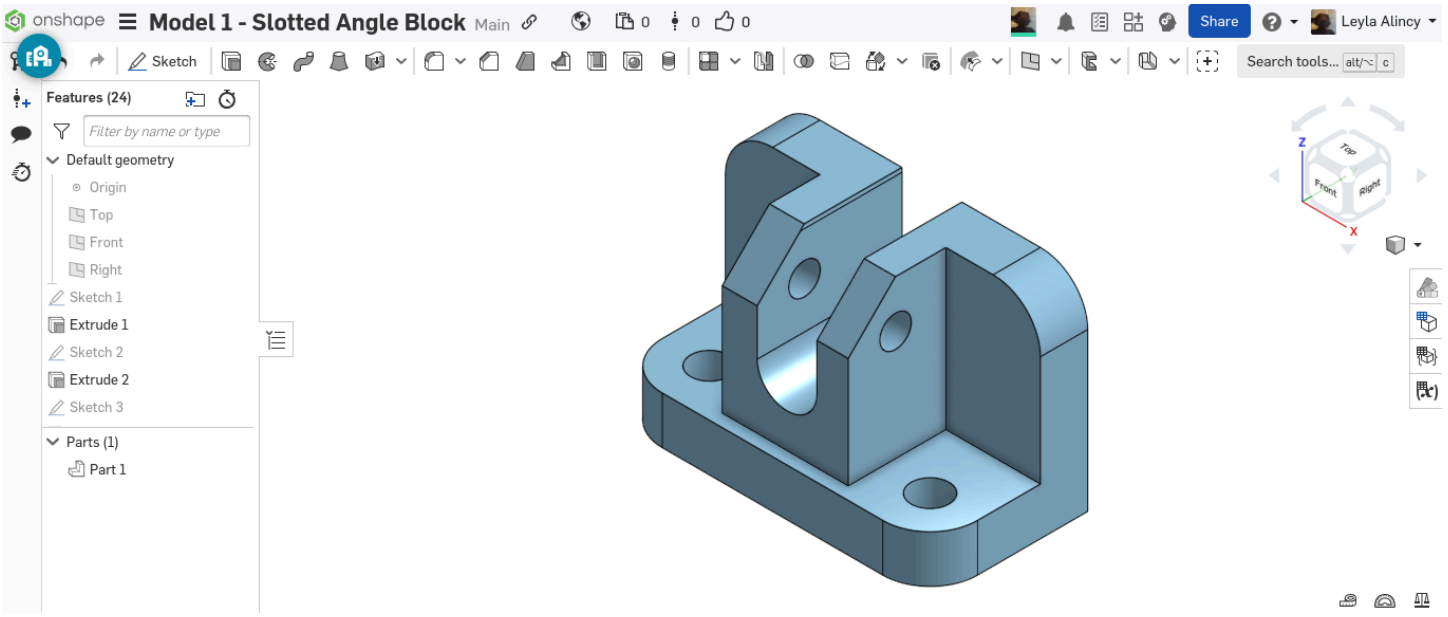
   d. How many parts can be painted with one gallon of paint that covers 400 ft2?

      337 parts can be painted with on gallon of paint that covers 400ft2 (400ft2/ 1.187ft2)

   e. What other processes could be used to create the same part?

      Other processes that could be used to create the same part are interchangeable parts.

Model	Properties
 Note: 1) All Fillets (4) = R15mm 2) Chamfers are 45°/ 15 mm by 15mm ***Model 4 –Pipe Support***	Model Material: Soft Yellow Brass (Brass, Soft, Yellow) Material Properties Density: 1.867e-5 Mass: 3.161 lb Volume: 169,299.06 mm3 Surface Area :29,500mm2



6. Answer the following questions using model 4.

a. What is the material cost of the part assuming that the cuttings are remelted and the cost of soft yellow brass is $13.50 per pound? What is the material cost of the part assuming that the cuttings are not remelted?

Assuming that the settings are remelted and the cost of soft yellow brass is 13.50 per pound the cost of the material would be $42.67. Assuming that the cutting parts are not melted the cost of the part would be $81.93.

b. What is the mass of the material lost in a typical machining process?

The mass of the material lost in a typical machining process is 2.908

c. What is the cost of the lost material based on your calculations above?

The cost of the cost material lost based on my calculations is $ 39.26

d. What other processes could be used to create the same part?

Processes that could be used to create the same part is 3d printing.