

Selection of Design Concept

Mobile Platform. The mobile platform settled upon for the final design is a combination of proposed designs two and three. The two designs were almost identical, using a framework of 80-20 aluminum extrusions to create a sturdy support for motor mounts, the ball hopper, and the control box.

The 80-20 frame was determined to be the quickest for construction, and would allow for ease of alteration, should it prove necessary as the final design comes together. Assembly and disassembly will be simple and the aluminum is both light and strong. Based off the decision matrix devised for the mobile platform, the 80-20 frame, manufactured in the general size of designs two and three will be the most cost effective, modular, stable, and controllable. The decision matrix is shown below (Table 1). All matrices may be seen larger in Appendix A.

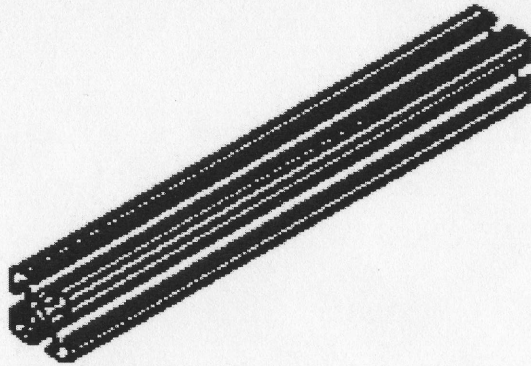
Mobile Platform			Design 1			Design 2			Design 3			Design 4		
Objective	Weighting Factor	Parameter	Mag.	Score	Value	Mag.	Score	Value	Mag.	Score	Value	Mag.	Score	Value
Speed	0.1	2ft/sec	yes	10.0	1.000	yes	10.0	1.000	yes	10.0	1.000	yes	10.0	1.000
Controllability	0.3	experience	fair	5.0	1.500	good	7.0	2.100	good	7.0	2.100	fair	5.0	1.500
Manufacturing Time	0.15	hours	6.000	7.5	1.125	5.000	8.0	1.200	4.750	9.0	1.350	6.000	7.5	1.125
Modularity	0.15	experience	good	7.0	1.050	good	7.0	1.050	good	7.0	1.050	good	7.0	1.050
Material Cost	0.1	\$\$	13.900	9.0	0.900	21.040	7.0	0.700	13.900	9.0	0.900	23.900	6.0	0.600
Stability	0.2	experience	great	9.0	1.800	great	9.0	1.800	good	7.0	1.400	great	9.0	1.800
Overall Value					7.375			7.850			7.800			7.075

Table 1: Mobile Platform Decision Matrix

As seen in the decision matrix, the criteria chosen to evaluate the mobile platform were speed, controllability, manufacturing time, modularity, material cost, and stability.

Speed was one of the factors determined to be least important. It was determined that completing the task successfully within the allotted time was more important than the fastest time. Consequently, speed was rated based on whether or not the selected wheels and accompanying motors would be able to provide a minimum speed of 2ft per second. All the designs were capable of surpassing the minimum speed.

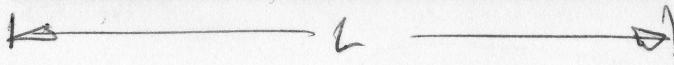
Controllability was the factor determined the most important for the mobile platform. In this instance, controllability referred to the ease of maneuverability and simplicity of operation in the robot. Due to the penalties that poor control over the robot could accrue, controllability was felt to be the most crucial aspect of the mobile platform. The platform's ease of maneuverability will also largely affect the speed with which the task can be performed. Design two and three both received "good" ratings on their controllability, largely due to their smaller, compact designs. All of the designs were almost identical with the exception of their sizes.



ITEM NO.	PART NUMBER	QTY.
1	8020 - 8 in	2
2	8020 - 12 in	4
3	8020 - 13 in	4
4	8020 - 14 in	2
5	8020 - 18 in	2
6	8020 - 6 in	2
7	8020 - 10 in	1
8	8020 - 15 in	1

L

dimensions?



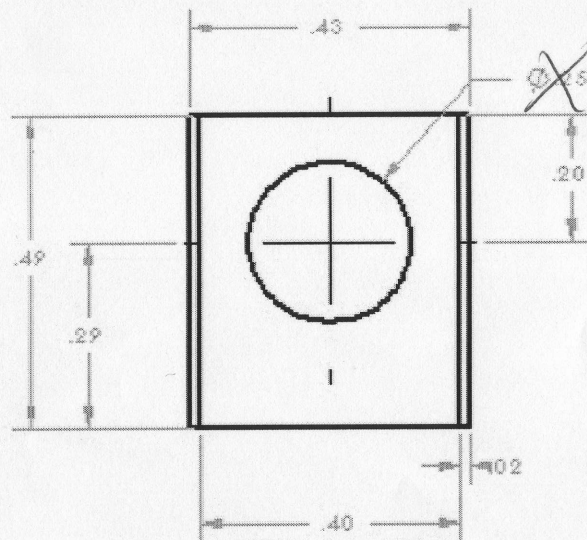
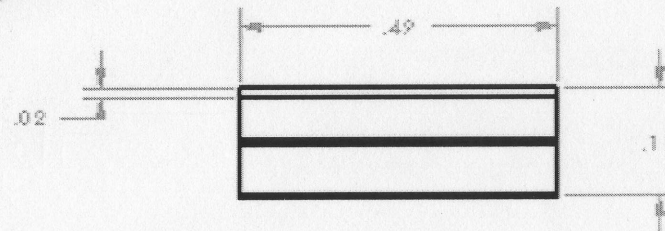
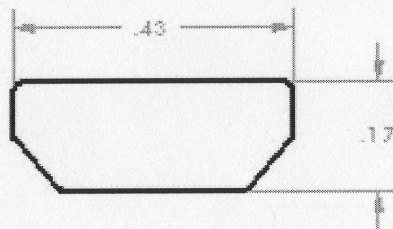
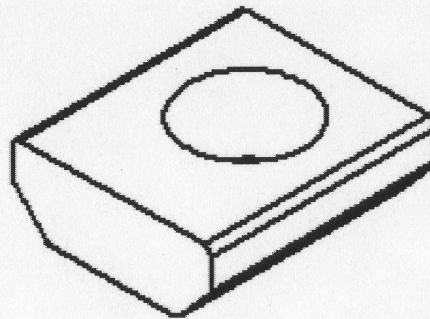
Notes:

1. QTY: 14
2. ALL DIMS IN INCHES
3. MATL: 8020 AL

poor print quality

TOLERANCE UNLESS NOTED				TITLE:	
OPERATION	PLACES IN DIMENSION			8020 Aluminium	
	1st	2nd	3rd	DRAWN	Millin Patel
MACHINING	±.015	±.020	±.030	CHECKED	Anthony Chandler
CUT OFF (SAW, BURN, SHEAR)	±.1	±.060		SIZE Dwg. NO.	
WELDING	±.1	±.060		A	EML2322L-XXX A
ANGULAR DIMS	±5	±2	±.5	SCALE 1:2	SHEET 1 OF 1

these aren't the tee
nuts we use



$\frac{1}{2}$ -20 UNC

Notes:

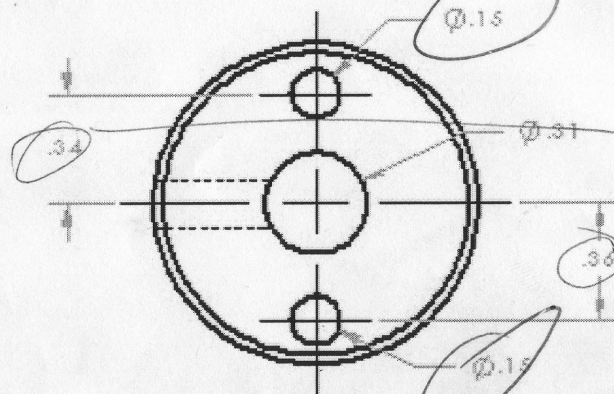
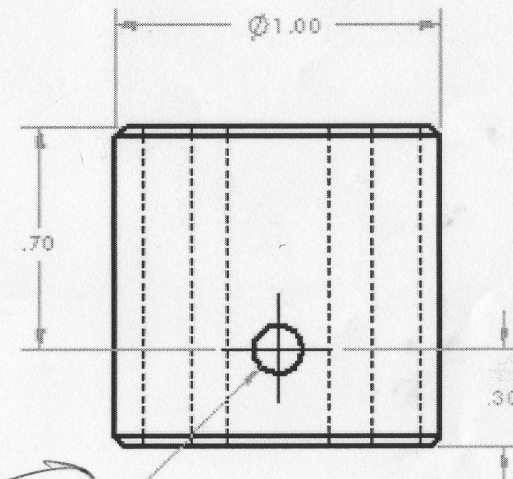
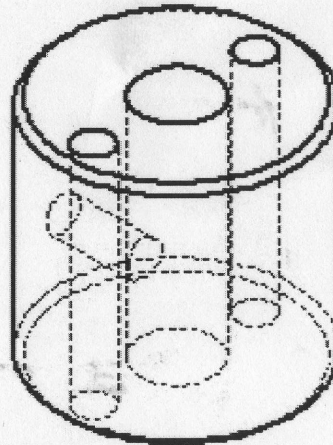
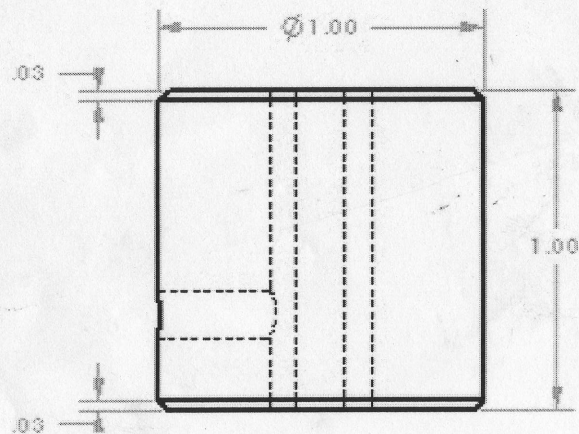
1. QTY: 26
2. ALL DIMS IN INCHES
3. MTL: ALUMINUM
4. FINISH ALL SURFACES

Steel

why?

TOLERANCE UNLESS NOTED				TITLE:	
OPERATION	PLACES IN DIMENSION			8020-3204-DEFAULT	
	1	2	3	DRAWN	Millin Patel
MACHINING	±.005	±.010	±.015	CHECKED	Anthony chandee
CUT OFF (SQU, BURN, SHEAR)	±.01	±.010		SIZE Dwg. NO.	
WELDING	±.01	±.010		A	EML2322L-XXX
ANGULAR DIMS	±.5	±.5	±.5	SCALE 4:1	SHEET 1 OF 1

Can you read this?



threaded?

threaded?

mat'l?
qty?

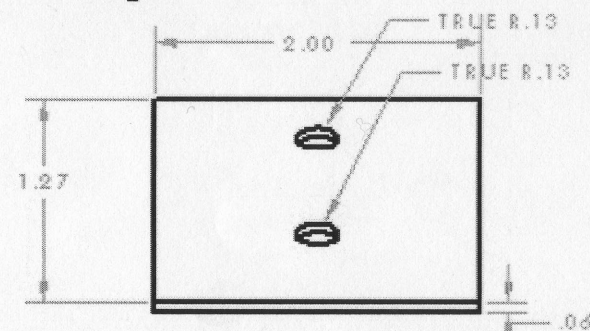
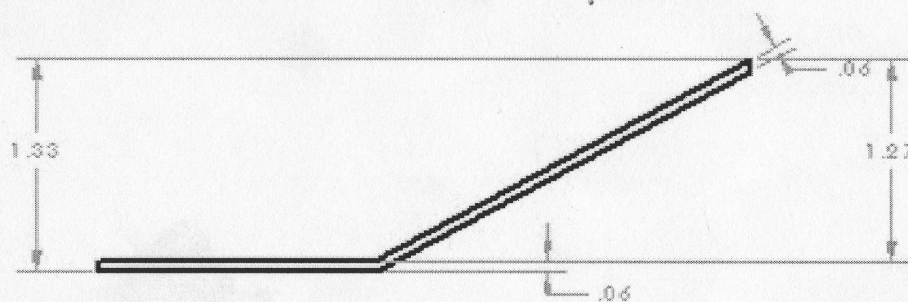
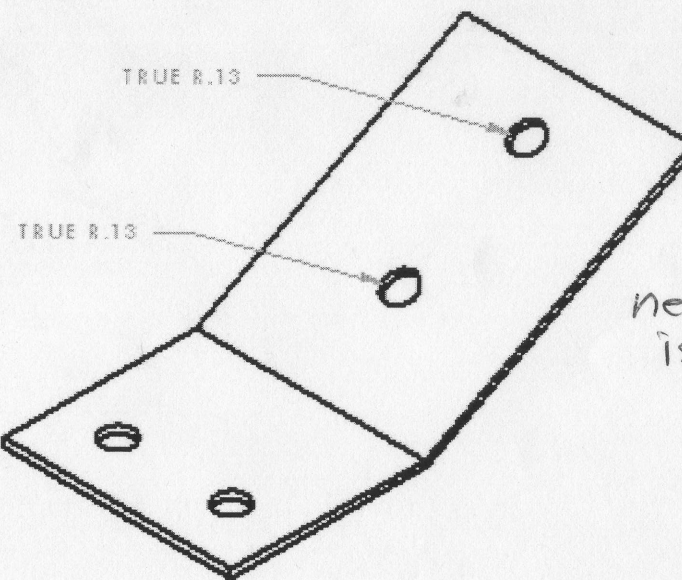
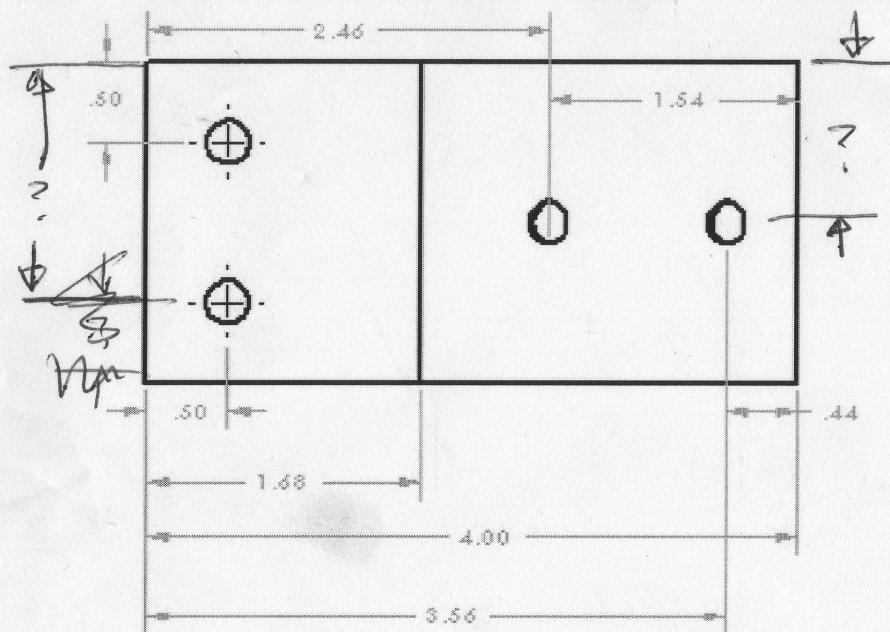
finished surfaces?
debur notes?

why are these
different?

TOLERANCE UNLESS NOTED				TITLE:	
OPERATION	PLACES IN DIMENSION			Door Hub	
	.1	.125	.150	DRAWN	Milin Patel
MACHINING	.005	.005	.005	CHECKED	Anthony Chandlee
CUT OFF (SAW BURN, SHEAR)	.01	.005		SIZE Dwg. NO.	
WELDING	.01	.005		A	EML2322L-XXX A
ANGULAR DIMS	.5	.5	.5	SCALE 2:1	SHEET 1 OF 3

1.59
then Tap

000



Notes:

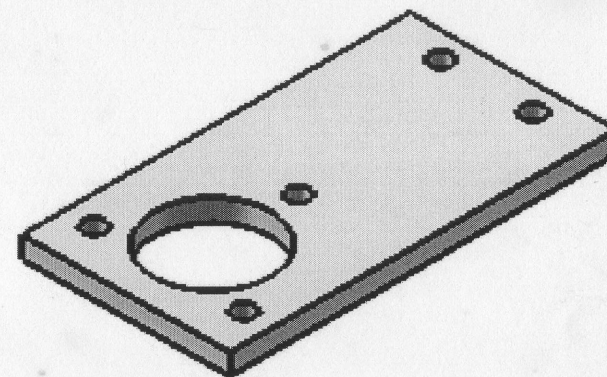
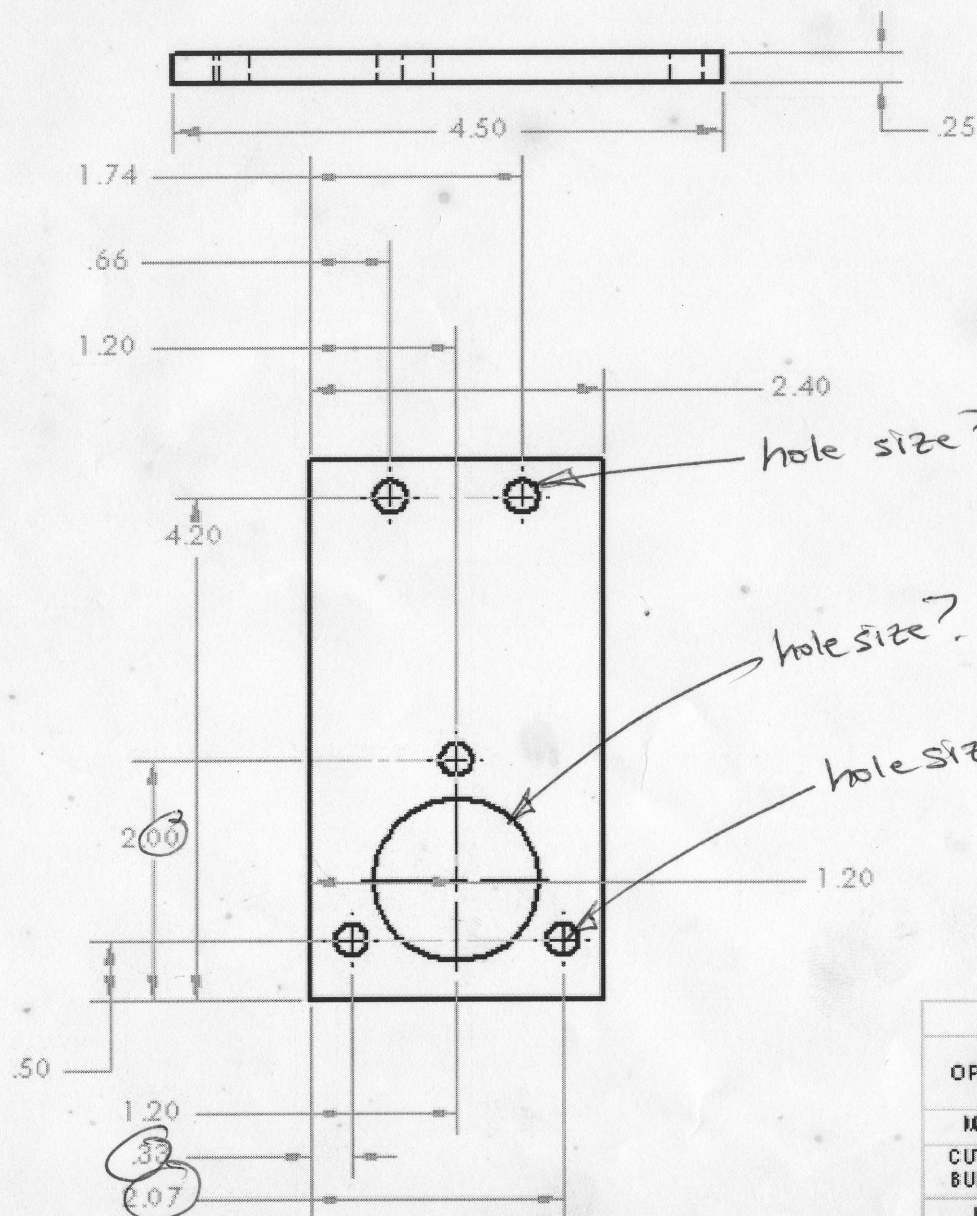
1. QTY: 2
2. ALL DIMS IN INCHES
3. MATL: ALUMINUM
4. FINISH ALL SURFACES
5. BREAK ALL EDGES

NO

TOLERANCE UNLESS NOTED				TITLE:	
OPERATION	PLACES IN DIMENSION			Arm to Hand Bracket	
	.1	.2	.3	DRAWN	Milin Patel
MACHINING	±.005	±.010	±.015	CHECKED	Anthony Chandlee
CUT OFF (SAU, BURN, SHEAR)	±.1	±.050		SIZE Dwg. NO.	
WELDING	±.1	±.050		A	EML2322L-XXX
ANGULAR DIMS	±5	±3	±.5	SCALE 1:1	SHEET 1 OF 1

REV

A



hole size?

hole size?

hole size?

mat'l?

g+y?

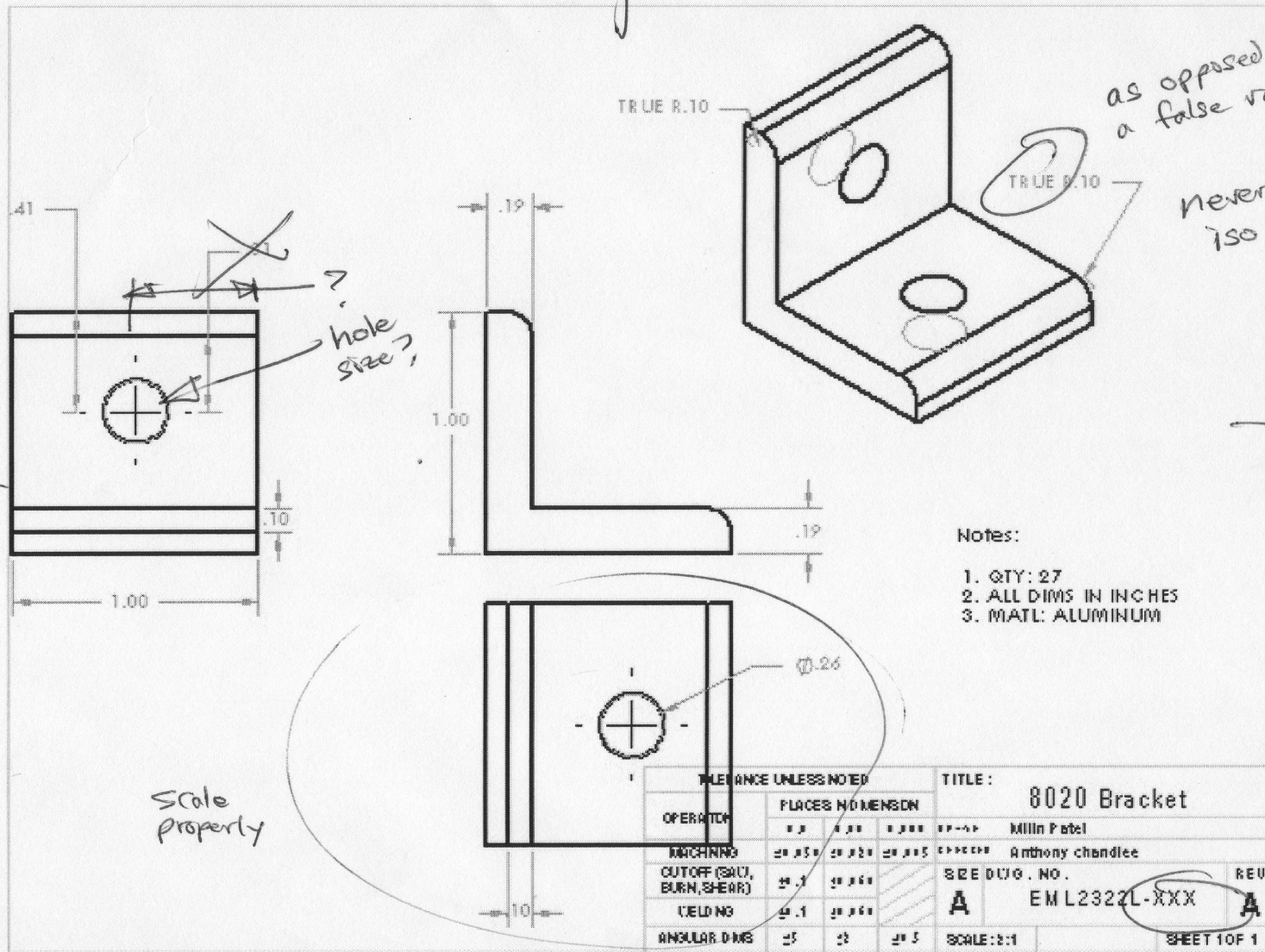
finished surfaces?

debur notes?

tolerances are inappropriate for these feature locations

TOLERANCE UNLESS NOTED				TITLE: Motor Mount		
OPERATION	PLACES IN DIMENSION			DRAWN	Anthony Chandlee	
	0.0	0.00	0.000			
MACHINING	±0.050	±0.020	±0.005	CHECKED	Milin Patel	
CUTOFF (SAU, BURN, SHEAR)	±0.1	±0.060		SIZE	DWG. NO.	
WELDING	±0.1	±0.060		A	EML2322L-XXX	
ANGULAR DIMS	±5	±2	±0.5	SCALE: 1:2	SHEET 1 OF 1	
	2	2	1		REV A	

print larger
and more clearly



as opposed to
a false radius?

never dim in
iso view

Notes:

1. QTY: 27
2. ALL DIMS IN INCHES
3. MATL: ALUMINUM

Scale
properly

TITLE:

8020 Bracket

OPERATION

PLACES H/D MENS/DN

MACHINING

± .005 ± .005 ± .005

CUTOFF (SAW, BURN, SHEAR)

± .1 ± .005

WELDING

± .1 ± .005

ANGULAR DIMS

± .5 ± .5 ± .5

DESIGNED BY

Millin Patel

DRAWN BY

Anthony chandee

SEE DWG. NO.

A

EML2322L-XXX

REV

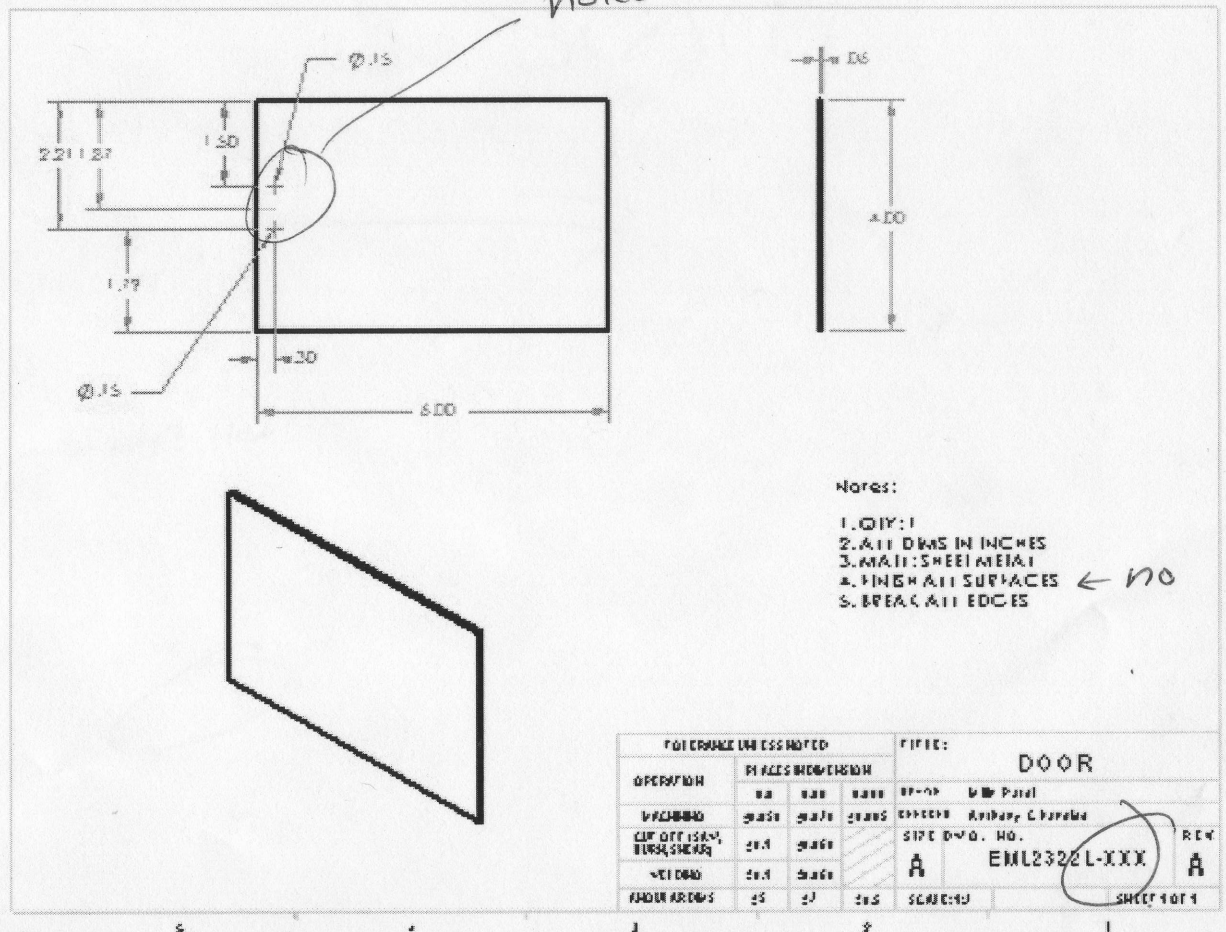
A

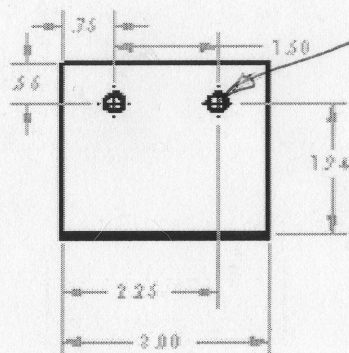
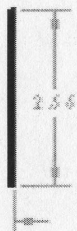
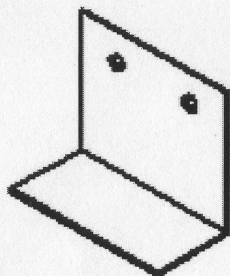
SCALE: 2:1

SHEET 1 OF 1

Print quality -

holes?





hole size

SCALE?

Notes:

1. QTY: 2
2. ALL DIMS IN INCHES
3. MATL: ALUMINUM
4. FINISH ALL SURFACES
5. BREAK ALL EDGES

WTF? How?

TOLERANCE UNLESS NOTED				TITLE:	
OPERATION	PLACES IN DIMENSION			Hand to Bucket Bracket	
	1.8	0.00	0.000	DESIGNED BY: Millin Patel	
MACHINING	±0.005	±0.001	±0.0005	CHECKED BY: Anthony Chandice	
CUT OFF (SAW, BURN, SHEAR)	±0.1	±0.001		SIZE Dwg. NO.	REV
WELDING	±0.1	±0.001		A EML2322L-XXX	A
ANGULAR DIMS	±5	±1	±0.5	SCALE: 1:2	SHEET 1 OF 1