Year Review

Monday, July 1, 2024 7:07 PM

Fall:
- Knowing ahead of time what needs to be changed to make manufacturing easier
  - Way to display that info/talk abt it
  - Meetings maybe
- Around ranked priority list time, make a more structured timeline
- More sponsorships for manufacturing
  - List of companies for manufacturing, emails are okay
- One page of DFM
  - Things to consider for different manufacturing methods
  - Example of good part/good drawing
  - To help w/ newbies and leads
  - "don't do ___"
- Making a last updated date to material stockpile
  - Little more organization for material/stock
- Liked the plastic manufacturing
  - Some transition into using actual machines
  - Make spherical cups, small things that are consumables for car, tabs, break buttons, soft jaws
- Having Drawings implemented into PDM
  - Maybe way to freeze parts in PDM
- Manufacturing/composites communication
- Waterjet for this year
  - Laser-cube 0-0
  - Waterjet 0-0
  - Tabs/jigs be biggest holdup for welding
- Only track jigs for 3d printing, leave parts to subgroups unless asked otherwise

December/Spring:
- Earliest purchasing in September, month lead time to stock (Jan 18th)
- More open manufacturing meetings abt timeline
  - More detailed status checkmarks
    - Example: find stock, cut stock, cnc op 1, cnc op 2, debur
    - Update note

Comp/Summer:
- Design Pres
  - DFM Phase, make sure everything is organized clean on car
- Validation
  - Making parts for summer, have a thread to request/talk abt part, make a meeting if asked
- Organize shop :3
- Manufacturing meetings each week to bring up ideas

Grayson:
-Mold Fabrication Start time can stay the same.
-Composites is revising our production process to better fit our timeline
-Need higher quality on molds to help reduce composites fabrication time
-mainly less defects is preferred (this is what nips us in the butt the most)
-MDF Delamination won't happen this year as we have our own air compressor that I will be getting hooked up
-We are redesigning molds this summer to make things easier
-Looking at other materials (likely different foams)
-If you want to do that test mold for quality, I can test this entirely new process this summer on just one wing
-Text me if you have questions :)

Sam Yang

I'd assume a lot of stuff is grain of salt because of availability of machines
- Knowing ahead of time what changes needed to be made on a part would be ideal only for weight and sim accuracy stuff
- Seems like manufacturing and composites had a hard time during the year knowing what is acceptable for mold CAD
- Was never super limiting, only really limiting when it came to like working out with abri's time
- Need to talk about how much can get manufactured into next year, upright, hub, etc.
- No good way of knowing like tradeoff of manufacturing methods

Arbi:
Manufacturing Tracker got released 12/19/24

Was manufacturing in arch Oct-Dec 22

SendCutSend order submitted 2/26

November 29th - started working on waterjet and noticed issues

Dec 10th sent out WJ parts order

Dec 19th got parts & garnet got in
^ Bray was working on it dec 22

Midwest steel order came in 12/20

Online metals order came in 12/15

Had people start organizing shop stock and tools nov 2

Got chassis tubes 12/1

Chassis Jigs 12/21

Had people 3d printing parts all oct, nov, dec

12/28 ran parts for lathe for car to not hold up welding

12/30 - was still tracking down leaks on wj

Jan 1-7th i was out of town but had a list of stuff for people to do and was always by my phone

jan 9th-10th bray started working on fixing leaks for wj

jan 11th - held meeting to assign tasks

Feb 27th bronze finally came in from order

Jan 11th lost all access to machines in O and was working to get tools out

Jan 18th (bray was "still having problems to get it to run smoothly") but was handed lathe and mill parts to run on his at home

Jan 18th - Started giving stock to ATS bc wj was still not working right and other options kept failing

Jan 27th - bray finished his lathe/mill parts & waterjet filters get jank jbweld fix

Jan 29 - made acc welding slats in arch, firewall mold in O

Jan 31st tried geting plasma cutter for tabs, failed

Feb 5th - bray asked for part and was given steering pickups, got real filters for wj

Feb 7th - still getting 3d prints done, acc parts ready to get picked up and welded

Feb 9th - Mills up and running and started to get coolant in them

Feb 14th - waterjet still not running great

Feb 18th - bray started making pickups on new mills, wj parts list got sent to school

Mar 8-15th out of town but had list running

Material Stockpiles

Wednesday, November 1, 2023 8:55 PM

Note:
If you plan on using stock highlight what ur using so ppl don't try to use the same shit

Example:
- Aluminum
  - 0.065 Thick
    - 23" x 21" - HV

Current Stock:
- Aluminum
  - 0.065 Thick
    - 23" x 21"
    - 15" x 24"
    - 11" x 17"
    - 24" x 4"
    - 5" x 9"
    - 15" x 16"
    - 24" x 24"
  - 0.25 Thick
    - 17" x 13"
    - 12" x 12"
    - 5" x 8"
    - 26" x 15"
    - 5" x 8"
    - 24" x 24"
    - 10" x 20"
    - 10" x 6"
    - 4" x 9"
    - 15" x 24"
    - 10" x 20"
  - 0.375 Thick
    - Palet
- Brass
  - 0.035 Thick
    - 26" x 24"

Current Stock:
- Steel
  - 0.050 Thick
    - 10" x 12"
    - 40" x 40"
    - 15" x 15"
    - 9" x 26"
    - 48" x 48"
  - 0.090 Thick
    - 24" x 24"
    - 12" x 18"
    - 19" x 5"
    - 24" x 27"
  - 0.125 Thick
    - 20" x 14"
    - 12" x 15"
    - 8" x 36"
  - 0.25 thick
    - 4" x 8"
  - 0.375 Thick
    - 9" x 12"

Current Stock:
- Polycarbonate
  - 0.050 Thick
    - 36" x 24"
    - 24" x 48"
    - 24" x 48"
    - 28" x 48"
    - 22" x 22"
  - 0.125 Thick
    - 48" x 48"
    - 24" x 36"
    - 36" x 36"
    - 75" x 48"
- G10
  - 0.031 Thick
    - 24" x 36"
    - 18" x 24"
    - 24" x 36"
- GRFP
  - 0.060 Thick
    - 24" x 36"
    - 24" x 36"
- Epoxy Glass
  - 0.03125 Thick
    - 36" x 48"
    - 36" x 48"
- GPO2
  - 0.040 Thick
    - 72" x 36"
    - 72" x 36"
    - 72" x 36"
    - 72" x 36"
    - 72" x 36"
- Acrylic
  - 0.25 Thick
    - 17" x 16"

Arbi Want

Wednesday, April 10, 2024 4:45 PM

https://5thaxis.com/product/dj6/?gad_source=1

Design

Thursday, May 30, 2024 6:12 PM

Manufacturability/ Serviceability	Ease of repair? Sub-systems accessibility, parts interchangeability, manufacturing complexity? Have fasteners been standardized? Are special tools required to diagnose/service vehicle?	___/15

MANUFACTURABILITY / FIELD SERVICEABILITY (0-15pts) **Score:_____**

Can the team efficiently build more than one car? Can it be fixed it in the field?

This category addresses the ability of a reasonable manufacturing facility to construct the vehicle *as presented* and for teams campaigning the vehicle to perform maintenance and repairs.

- Are unusual, or specialized, machining operations required? Exotic / expensive materials?
- Are fasteners standardized (SAE or Metric?) throughout vehicle?
- Have the number of fastener sizes been minimized?
- Are components from various corners of the car interchangeable?
- Can all areas of vehicle be accessed without major component (engine) removal?
- Can components be substituted in-field with conventionally available items?
- Is special training or equipment required to service subsystems? Will this prove unreasonable as the car is campaigned outside the university environment?
- Other _____
- Other _____

Comments:_____

_____

_____

_____

_____

_____

FSAE Design Event Scoring (Some Insights into the Process)

The design and development process of a FSAE car is a complex process. So is judging! Although many metrics and details are reviewed during judging, it is easy to overlook various features which are critical to a given team's efforts. As such, it is critical for team members to pro-actively highlight these special details, how they support the team's overall goals, and how they distinguish them from the competition. Do not rely on the judges to hunt for the cool bits!

Judges **and** teams should be familiar with the scoring categories. A detailed break-down of each category follows, along with system relevant example questions. These examples exhibit just ***some*** of the key attributes that teams should be prepared to discuss, both in theory and as applied to their vehicle, with the judges. Note: While some categories may list components not in your design, if you present a data driven argument for omission, along with a demonstrated knowledge on the topic, your team may still receive points in that category. One example being aero.

Judges: Please provide as many detailed comments as time permits, for the benefit of students! Judge observations and comments shall be provided on the attached sheets for future review.

Remember: Judges are not just scoring your vehicle, they are also scoring ***your knowledge and understanding*** of vehicle development and performance. Reflective of this, for each major design score category, judges shall evaluate the teams and assess points per the following breakdown:

Design (~25%): Assessment of design process used by team. Is this a new design, evolution, or complete carryover? Were different design options considered? What criteria was used to make design decisions? Were appropriate pre-build analyses performed? Is this an integrated design, or a series of independent sub-system designs?

Build (~25%): Does the physical specimen presented reflect the early design work? Is it reflective of the design report? If not, why not? What special manufacturing considerations were encountered? Were the build methods / processes appropriate and well executed?

Refinement/Validation (~25%): How thorough and objective was the team's testing? Was a test plan developed and executed? Were discrepancies between predicted and tested results documented and acted upon to improve final build?

Understanding (~25%): Does the team presenting the car at competition understand it? Are they intimate with the design and the engineering fundamentals it attempts to exploit?

IC Feedback 2024

Thursday, May 30, 2024 6:13 PM

Skitter

- Composites: Bring ppl in, have them make something, have them come across problems they are probably going to come across and work up their skills before actually applying it to parts going on the car
  - *bc saw a lot of failure and wasted time with fuck ups on the real parts
- Creating Standard Procedures
- Learned a useful lesson, too many small pieces on the header
- Hard time adjusting the camber bc the shims are on the bottom and you have to jack the car up, so next iteration of uprights
- Measure every hour you spent designing the car, cost at engineering rate, and every hour spent manufacturing, so on and so on
- It's worth spending the time doing the CAM versus cranking out soft jaws, have some slides on it and some data on it while u measured it
- Its never a presentation, its always a thesis defense
- Thought process is great, bring some numbers and get some points
- Weight saving in the uprights, making smart moves about the radii in there, can go even simpler sometimes and say we'd save more grams if we machined out a pocket, but what we just drilled a hole, all the way through maybe not all the way through, just a plunge. Again how much time could you save there. What about speed holes. Round so they are strong and as long as you've left enough material everywhere. Instead of doing this really complicated machine op, using this absolutely ridiculous tool, just drill 3 vertical holes and take out a bunch of material.
- Just consider the time to machine vs the weight saving
- Loging all of data in slides
- Have a whole bunch of small presentation, never going to be a start to finish, but 3 slide presentation on this thing, 3 slides on that, 2 slides on this
- Back up what saying with numbers

Ease of repair?
Can it be fixed in the field?
Is special training/eq required to service subsystems? Will this prove unreasonable outside FSAE environment?
Are special tools required to diagnose/service vehicle?

Sub-System accessibility?
Can all areas of vehicle be accessed without major component (engine/acc) removal)?

Part interchangeability?
Are components from various corners of the car interchangeable?
Can components be substituted in-field with conventionally available items?

Manufacturing complexity?
Are unusual/specialized machining ops/materials required?

Have fasteners been standardized?
Have the number of fastener sizes been minimized?

Can the team efficiently build more than one car?

Other Judges

- Generally speaking none of the design judges care to much about manufacturing
- When I look at the car, after talking to design lead, "so that's the theory behind it, did that come to fruition, what does that look like"
- Did I make this design rlly cheap, rlly easy to manufacture so I could get to test sooner, okay cool great, where's the test data to show that actually worked out
- Car looks a little busy, reusing parts and wiring harnesses
- Radiator fan line is not tied up
- If grab someone off the street and they aren't immediately like "wow that's beautiful", there's things to improve
- All welds need to be perfect and manufactured parts need to be good
- Car is here so all parts were manufacturable
- Can see distortion on the weave, fucked tape
- Things difficult to assemble?
- What were high level goals and how does everything relate to those high level goals. If goal was to get car done by X date, here's my gantt chart, all the allotted time, resource loaded plans and capacity constraints that show we only have time to design these 10 components, okay how much time do you have to fabricate, how much time to design, did targets come on time or were they early/late, how did that effect everything else supposed to happen afterwards
- Okay to say we don't have someone who knows how to design uprights and can give the time to learn so we remade the ones from last year, not a perfect answer but better than no answer
- If not actually changing setups, then don't have setup changing parts, just extra weight, show effect of changing setups
- What will we learn for next time and how will we apply
- What do we see immediately and see, oh a lot of thought has been given to this and that but its not even throughout car
- Loose wires near hot things bad cuz inc temp inc resistance
- Nothing jumped out to ask a question "why did you do that", "cant get that out"

Back to Skitter

- Shouldn't be talking to other judges abt manufacturing, that's the one judges role
- Have an example of: this is the upright they handed me and I told them no, page, and these were the concerns/estimated time/utterly unrealistic specs and back and forth and back and forth
- If part rlly bugs me to make, be like oh this is going in the design binder
- Divide and rise
- Bring props, prototypes, and broken parts

EV Binder 2024 TODO

Thursday, May 30, 2024 6:14 PM

Current limiting factor isn't tooling available, it's knowledge, time, and technically tooling cost (however that is divided during the design process > out of scope)

How to show

- [ ] Show training plan

Ease of repair?

- Can it be fixed in the field?
- Is special training/eq required to service subsystems? Will this prove unreasonable outside FSAE environment?
- Are special tools required to diagnose/service vehicle?

Sub-System accessibility?

- Can all areas of vehicle be accessed without major component (engine/acc) removal)?

Part interchangeability?

- Are components from various corners of the car interchangeable?
- Can components be substituted in-field with conventionally available items?

Manufacturing complexity?

- Are unusual/specialized machining ops/materials required?

Have fasteners been standardized?

- Have the number of fastener sizes been minimized?

Can the team efficiently build more than one car?

Design Research o-o

Thursday, May 30, 2024 6:15 PM

Options
Riccardo wave, dry sump, test intake, radiator
Conductor sizing, radiator, acc cooling, temp modeling
Test arb(s), yoke plate improvements, bell crank redesign

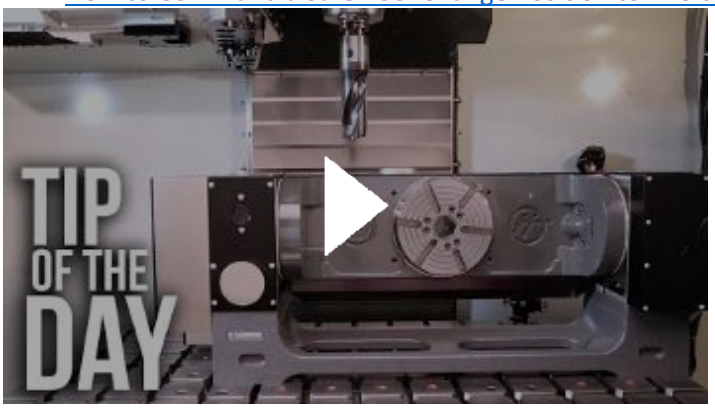
CNC Notes

Thursday, February 22, 2024 6:56 PM

Avoiding Work Piece During Tool Change

Thursday, February 22, 2024 6:56 PM

Link: How to Command a Safe Tool Change Position to Avoid Fixtures and Rotaries – Haas Tip of the Day



Easily Create Your Own Custom M and G Codes – Haas Automation Tip of the Day

Purpose: The purpose of this is to prevent us from ramming tools into parts during tool changes. This is a concern when you have long tools, tall work pieces, or large fixtures such as a 4th axis. Program works by creating a sub-program when an M06 is called, when a tool change is called in the G Code. Programs simple tell machine where to move the axis before a tool change.

How it works: Program is set to program 09000 and is set to the Alias M Macro Call 09000. This will move the Z axis tables to the machine coordinates below. This location is closest to the door and furthest to the right of the machine. If the vice setup of the machine is ever changed, keep this in mind as you will probably want to set it up further to the right of the table to provide more room for

Warnings: Setting up this program requires turning on the ability to edit 09000 programs in the settings of the machines, so be cautious when editing. I set this up by following the video almost step by step.

Note: In the standard post processer, this does not save you from running into the part. The safe position in the post processer is not the maximum height of the machine (at least in the case of the Mini-Mills, Z0 sits at tool change height but the machine has about 4 more inches it can go up). Safe position is considered Z0, if your work sits above that, the machine will come down into the part.

Machine Coordinates
X: -16
Y: 0
Z: 4.41

Endeavors

Tuesday, July 18, 2023 3:10 PM

Anything that I'm working as lead that's not written on paper is here, this is more team stuff than manufacturing :D

Tracking

Monday, December 18, 2023 3:46 PM

Manufacturing Tracker.xlsm

Sponsor Emails

Friday, July 14, 2023 5:59 PM

LOCAL MACH SHOPS ONLY!! (plz double check before sending out)

Subject: Inquiry for Sponsorship - Kennesaw State Motorsports

Dear [Company Name],

My name is [Your Name] and I am writing on behalf of Kennesaw State Motorsports, a team of students that designs, builds, and competes with Formula-style cars at the FSAE IC and EV International Competitions. We are reaching out to explore a potential sponsorship with [Company Name]. Our machine shop at Kennesaw State University has encountered unexpected construction delays, resulting in a completion timeline of mid-October. As a result, our team's timeline and manufacturing process for the Formula SAE competition has been severely impacted.

In light of these challenges, we would like to connect with [Company Name] to discuss the potential for sponsorship, including machine services, and other forms of support. In return, we would offer prominent brand promotion during the international Formula SAE competition and within our university community.

We would greatly appreciate the opportunity to discuss this further and explore the potential partnership. If you have any specific sponsorship opportunities or require additional information, please let us know.

Thank you for considering our request, and we look forward to the possibility of collaborating with [Company Name] Inc.

Best regards,
[Your Name]

For Big Companies LOL, gotta flex

Subject: Sponsorship Inquiry - Kennesaw State Motorsports

Dear [Company Name],

My name is [Your Name] and I am reaching out on behalf of Kennesaw State Motorsports, a team of students that designs and builds Formula-style cars for the FSAE IC and EV International Competitions. We're thrilled to share that we recently secured an impressive 6th place overall in the EV competition, surpassing our local competitors at Georgia Tech. We're driven to continue our upward trajectory, and we believe that a sponsorship from [Company Name] would be instrumental in achieving our goals.

With your support, we can enhance our design and fabrication capabilities, gaining access to cutting-edge machinery, tools, and resources. In return, we offer prominent brand promotion during the international Formula SAE competition and within our university community.

Our shared values, commitment to excellence, and passion for engineering make us an ideal candidate for sponsorship. Let's discuss this exciting opportunity further and explore how we can mutually benefit each other.

Thank you for considering our request. We look forward to the potential partnership.

Best regards,
[Your Name]

Kennesaw Motorsports - Formula SAE
1100 South Marietta Parkway Q134 | Marietta Ga, 30060
ksumotorsport@gmail.com | Facebook | Instagram

CC: KSUMotorsport@gmail.com, Awats111@students.kennesaw.edu

Draft for a new sponsor email templete

Dear [company],

My name is [Insert] and I've noticed on [LinkedIn/Website/Social Media] that your company specializes in jobs involving [manufacturing/metalworking] and provides quality service to your customers. I am currently the Vice President of my university's Formula Sae team, which is a competition that challenges engineering students to design, fabricate, develop, and compete with a small-style Formula car in competitions across the US. We are currently working on a [project] that requires the use of [component/machine] and would like to have an opportunity to connect with [company]

For context, the use of these [Components/Machines] would enable us to [whatever the goals for your project are].

If possible we would love to schedule a [call/meeting] with a date and time that works for your schedule. Thank you for your time and hope to hear back from you soon.

Kennesaw Motorsports - Formula SAE
1100 South Marietta Parkway Q134 | Marietta Ga, 30060
ksumotorsport@gmail.com | Facebook | Instagram

CC: KSUMotorsport@gmail.com, Awats111@students.kennesaw.edu

What you want first and then context

- Sponsorship request first, then context
- Initial Email smaller, send longer
- Linkedin & phone call
- :P

Training Stuff

Tuesday, July 18, 2023 3:20 PM

CLASS THOUGHTS (not final)

- Intro to Manufacturing:
  - Different Machines
  - Tools
  - Common Terms
  - Maybe in mach shop so I can actually show them
- Safety in the Machine Shop:
  - Picture Search w/ candy prize to encourage memorization
- Series of Events in Computer Labs:
  - Start w/ a CAD class (not taught by me)
  - Next have a drawing that builds on what they CAD to teach proper callouts etc.
  - Then have a CAM class that builds on that
  - Continuation or CAM/Finally have a CNC class where we use Desktop Mills to CNC something small
    - I was thinking a simple engraving on some cut scrap sheet metal, its simple because its fast and easy, and personal
    - Can also check CAMs before they go thru
    - Can add a "challenge" of making it one continuous line like a Heart or Letter, but rlly just makes it easier for us because its not multiple operations
- Materials & Tools:
  - Pros and Cons of the Alum & Steels we use most/why we use them where
  - Different tools (endmills,drills,etc.) pros/cons/idk
  - YUh
- Waterjet if ready:
  - General idea is to show how to waterjet some sheet metal, have read a drawing and mark it, and then bend it
  - Would be simple simple shapes like a box or triangle
  - Could also outsource waterjet pieces

TO-DO Before Classes:

PPTs

- [x] Intro
- [x] Safety
- [ ] Cad
- [ ] Materials & Tooling
- [ ] Cad for lab & drawings

Approval of PPTs & Lab Plans

- [ ] Intro
- [ ] Safety
- [ ] Cad
- [ ] Materials & Tooling
- [ ] Cad for lab & drawings
- [ ] Milling Class Doc
- [ ] WJ Class Doc

Random

- [ ] Cut up HDPE into 2x2x0.5 blocks
- [ ] Get candy to chuck at ppl
- [ ] New Safety Docs
- [ ] Videos playlist to help those virtual
- [ ] Layed out plans for classes to make sure they run smoothly

Final Classes Dates:

8/29 - 8pm - Intro

9/5 - 8pm- Safety

9/8 - 7pm - Cad

9/12 - 8pm- Materials/Tooling

9/15 - 7pm - CAD for Lab & Drawings

9/19 - 8pm - CAM & Desktop Milling

9/22 - 7pm - Water jetting

Desktop Mill Manufacturing thoughts:

- Will be machining 0.5"x2"x2" Black/Yellow Color-Core HDPE Plastic (only do 5000 rpm)
- There are currently 3 desktop mills in the Makerspace
  - Need to get card access from Mike & check with scheduling for Tim
- One line engravings, they can pick the shape and we will walk them through the CAM
- CAD day 1, CAM day 2, CNC day 3
  - To make sure no one falls behind if they miss one, we will

People at intro meeting

-

CAD Class Pt.1

Friday, September 8, 2023 4:47 PM

Title: Introduction to SolidWorks and CAD Thinking

Agenda:

I. Introduction to CAD and SolidWorks (5 minutes)

- Welcome participants and explain the importance of CAD in design and engineering.
- Briefly introduce SolidWorks as a popular CAD software used for 3D modeling.
- Highlight the relevance of CAD thinking in product design and development.

II. SolidWorks Interface Orientation (5 minutes)

- Demonstrate the SolidWorks interface, focusing on:
  - Command Manager
  - Feature Manager Design Tree
  - Graphics Area
  - Property Manager
- Emphasize the importance of familiarizing oneself with the software's layout.

III. The CAD Mindset (5 minutes)

- Explain the CAD mindset:
  - Thinking in 3D: Encourage participants to visualize objects in 3D space.
  - Design Intent: Stress the importance of planning and sketching before modeling.
  - Parametric Modeling: Mention how changes in one part affect the entire model.
  - Reusability: Emphasize creating features that can be reused in different designs.

IV. Hands-on Modeling Exercise (15-20 minutes)

- Choose a simple part like a basic geometric shape (e.g., a cube with a hole) for beginners.
- Provide step-by-step guidance on how to create the part in SolidWorks:
  - Sketching the shape
  - Extruding and creating the hole
  - Adding fillets or chamfers
  - Modifying dimensions
- Demonstrate how to use features like fillet, chamfer, and dimension tools.
- Encourage participants to ask questions and follow along on their computers or observe your live demonstration.

V. Tips and Tricks (5 minutes)

- Share a few essential SolidWorks shortcuts or best practices for efficient modeling.
- Discuss the importance of saving projects and version control.
- Mention available online resources and SolidWorks community forums for further learning.

VI. Q&A and Conclusion (5 minutes)

- Open the floor for questions and clarify any doubts.
- Summarize the key takeaways from the session, emphasizing CAD thinking.
- Provide additional resources for self-study and practice.

Homework (Optional): Assign a simple modeling task for participants to complete on their own as a follow-up exercise, reinforcing the concepts learned in the class.
Remember to adapt the pace and complexity of the class based on your audience's familiarity with CAD and SolidWorks. Encourage active participation and engagement to foster CAD thinking effectively within the given time frame.

Knowledge transfer

Monday, July 10, 2023 6:20 PM

First and foremost, time is the one thing that every member can contribute to a design team.

No matter what their role or their year in school, if someone is putting in the time to find how they can best contribute to the team's success, they are useful to the team.

Both old and new members should persistently be working to effectively build a racecar and learn to design a better one in the future.

For many of us, especially the young ones, putting in time meant reading relevant articles, machining important parts, and being exposed to every system and test on the car.

For those who were older, it meant stepping into a managerial position that oversaw scheduling, manufacturing, and providing insight to underclassmen.

Machine shop specs

Tuesday, September 5, 2023 10:59 AM

Name of Manufacturer: OMAX
Type of Equipment: Waterjet
Model Number: MAXIAM 1515
Power requirements: 3-Phase, 480 VAC, 60Hz
Water requirements: water hookup for a hose (abt. 12g/min)
Air requirements: 20 cfm up to 30cfm
Location of equipment: Breeze way

Name of Manufacturer: OMAX
Type of Equipment: Sump Pump
Model Number:
Power requirements: 115 VAC, 20A **GFCI
Water requirements: Drain flow 5gpm min
Plumbing requirements: Check valve outlet, isolation valve on inlet and outlet
Location of equipment: Breeze Way

Name of Manufacturer: OMAX
Type of Equipment: Waterjet Pump
Model Number:
Power requirements: 480 VAC, 60Hz, 40 A
Water requirements: 20 psi min., 3.2gpm min.
Location of equipment: Breeze Way

Name of Manufacturer:
Type of Equipment: Waterjet Chiller
Model Number:
Power requirements: 480 VAC, 60Hz, 15 A
Location of equipment: Breeze Way

Name of Manufacturer: Dell & OMAX
Type of Equipment: Waterjet Computer & Controller
Model Number:
Power requirements: 115VAC, 15 A **on it's own breaker, wall mounted outlet, & GFCI
Location of equipment: Breeze Way

Name of Manufacturer: OMAX
Type of Equipment: Waterjet Hopper
Model Number:
Air requirements: 75psi min. 20 CFM
Location of equipment: Breeze Way

Name of Manufacturer:
Type of Equipment: Hydraulic Press
Model Number:
Power requirements:
Location of equipment:

Name of Manufacturer:
Type of Equipment: Manual Mill
Model Number: JTM-1
Power requirements: 3 phase, 230 V, 60 Hz, 40 A
Air requirements: Air hookup nearby 5cfm
Location of equipment:

Name of Manufacturer:
Type of Equipment: Manual Lathe
Model Number:
Power requirements:
Water requirements:
Air requirements:
Location of equipment:

Name of Manufacturer: HAAS
Type of Equipment: CNC Lathe
Model Number:
Power requirements: 220 VAC, 40 A
Air requirements: 4 scfm @ 100 psi
Location of equipment: O100-1

Name of Manufacturer: HAAS
Type of Equipment: CNC Mill x 2
Model Number:
Power requirements: 220 VAC, 40 A
Air requirements: 4 scfm @ 100 psi
Location of equipment: O100-1

Type of Equipment: General Equipment (Belt sander, band saw, power tools, etc.)
Model Number:
Power requirements: 120VAC, 20A outlets spaced around every 4ft, no more than 4 junctions per circuit
Location of equipment: O100-1

Name of Manufacturer:
Type of Equipment: Composites Fridge
Model Number:
Power requirements: 220/20amp(single) 115/20amps
Location of equipment:

Name of Manufacturer:
Type of Equipment: Composites Venturi
Model Number:
Air requirements: 20 CFM
Location of equipment:

Name of Manufacturer:
Type of Equipment: Dyno Computers/Dyno Controller
Model Number:
Power requirements: 115VAC 15A **isolated
Location of equipment:

Name of Manufacturer:
Type of Equipment: Edy Current break
Model Number:
Power requirements: 115VAC 20A**isolated
Location of equipment:

In Gen:

A low height water spigot should be avable to fill coolant tanks.

Drop down air connections show be accommodated for

Seprate branch 120v 20A for vacumes

Another branch of 120V for cleaing drop cords

**try meet with guy cuz confusion
**is there a plan to update the fume extractor in dyno / fan in composites

Every air drop should have a drier and a regulator

Master CAM -0-

Monday, September 18, 2023 6:14 PM

Mastercam EDUCATION

cnc software, inc.

Team Sponsorship Agreement

Mastercam Education ("Mastercam") is pleased to sponsor teams participating in SAE International. As a participating team in this program (the "Team"), please be advised of the software and support we offer your Team and, in exchange, acknowledge our expectations from your Team in this Team Sponsorship Agreement (the "Agreement").

The terms and conditions of this Agreement are as follows:

Term: This Agreement commences with the sponsorship request from the Team and ends one year from date of software license activation, which shall be annual, unless terminated by either party per the provisions below. The term may be renewed on an annual basis by request.

The Team agrees to:

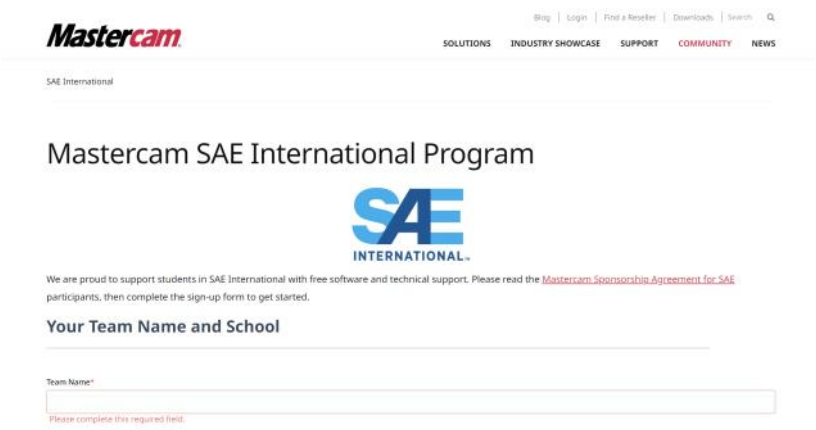
- Adhere to the terms of this Agreement.
- Provide, upon request, the name and contact details of relevant Team member contacts.
- Provide progress updates and details of contest participation to Mastercam.
- Connect with Mastercam on social media.
- Display Mastercam logo on project (e.g. vehicle, robot, etc.) and on Team website, listing Mastercam as a Team sponsor.
- Allow Mastercam to reference the Team's project/name and accompanying logo, if any, for marketing materials (e.g. blogs, etc.) in a format solely determined by Mastercam for the duration of the Term of this Agreement.
- Use the provided Mastercam software and resources solely for the purposes of the Team project.
- Receive email communications from Mastercam about product information, marketing promotions, surveys, and digital newsletters.
- Contact educational.programs@mastercam.com with any questions.

Mastercam agrees to:

- Adhere to the terms of this Agreement.

- Provide the following throughout the Term of this Agreement:
  - A number of Mastercam Educational Suite seats (yearly-timed renewable eval software licenses for team use).
  - Software updates throughout the Term of this Agreement.
  - Access to technical support.
  - Free download of Mastercam Demo/Home Learning Edition (HLE).
  - Mastercam logo(s) in required format(s) for placement as mutually agreed.
- Connect with the Team on social media in show of support.

By submitting a Sponsorship Request form on the Mastercam website (www.mastercam.com) to Mastercam, the Team acknowledges receipt and acceptance of this Agreement.



https://www.mastercam.com/sae-international/

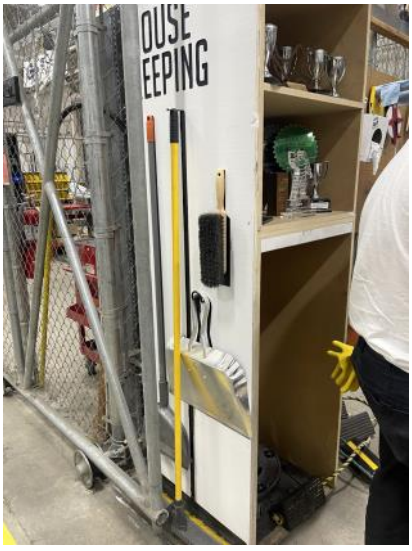
- MasterCAM sponsorship approved 10/5/2023
- Licenses expire - Oct 31, 2024
- Qty: 10

LISCESES TRACKING SHEET

Name	License Number	Date Given
Shop PC Left	W489886	11/7/2023
Shop PC Right	W489887	11/7/2023
Abrianna Watson	W489888	11/8/2023
Joshua Bray	W489889	4/3/2024
Brenden Barclay (BJ)	W489890	11/15/2023
	W489891	
	W489892	
	W489893	
	W489894	
	W489895	

Shop Space Thoughts

Monday, October 16, 2023 12:23 PM



Schizo Notes

Thursday, November 2, 2023 11:58 AM

- What manufacturing processes do yal use?

- What would I be doing for the position?

- Where would the manufacturing internship be?

- Whats the structure of the internship, is there a mentor or single managment?

- Whats the pay & Hours roughly?

- talk about what busbarscross section area, heat generation, material choose for weight optimaization

-work on the floor, in a factory, or offsite office building

-

- 3/4” 4FL
- 3/8” BALL
- 3/4” BALL
- 5/8” 2FL
- 5/8” 2FL
- 5/8” 2FL x2
- 3/8” 4FL
- 3/8” 4FL
- 3/8” 4FL
- 3/8” 4FL
- 3/8” 4FL x2
- 5/16” 4FL
- 11/31” 4FL
- 1/2” BALL
- 1/2” BALL x2
- 1/2” BALL x2
- 1/2” 2FL
- 1/2” 2FL
- 1/2” 2FL
- 1/2” 2FL
- 1/2” 2FL x2
- 1/2” 4FL
- 1/2” 4FL
- 1/2” 4FL x2
- 1/2” 4FL x2
- 1/2” 4FL
- 1/2” 4FL
- 1/2” 4FL
- 1/2” 4FL
- 3/4” 2FL
- 3/4” 2FL
- 3/4” 2FL
- 5/8” 4FL
- 11/16” 4FL
- 11/16” 2FL
- 1/2” 3FL
- 3/4” 2FL x2
- 3/4” BALL x2
- 3/4” 2FL
- 3/4” 2FL
- 3/4” 4FL x2
- 3/4” 4FL
- 7/8” 2FL
- 9/16” 4FL
- 3/4” 6FL
- 3/4” 3FL
- 3/8” 2FL

Machining Tracking

Monday, June 26, 2023 8:55 PM

Manufacturing

Project	*Manufacturer*	*Quantity*	*Stock (YES/NO)*	*Machine type(s)*	*Machined/Obtained (YES/NO)*	*Assembled? (YES/NO)*	*Completed (on the car) (YES/NO)*	*Notes*
FW Top Mold		1						
FW Bottom Mold		1						
RW Top Mold		1						
RW Bottom Mold		1						
Accumulator Mounts		8	Y					
Accumulator Tabs		8						

What do I want out of the system:

- Easy access to drawings & dxf files
- What the part is
- How many are needed
- What stock it uses, do we have it yet
- Priority
- Cam file / CAD
- Subgroup
- Responsible lead
- Responsible engineer
- Machinist
- Tooling required
- A way to link to pdm would be nice so everything is updarted but not neccicary

Welding

Thursday, July 13, 2023 4:19 PM

All stuff welding related :D

Weldmenting Assessment

Friday, July 14, 2023 12:19 AM

Weld Vids

Friday, July 14, 2023 12:19 AM

Welding Go EEEEEEEE

Wednesday, July 12, 2023 9:16 PM

Intro To Weld ---> Weld 1102---> Partial Weldment--> Weldment Theory---> Advanced Weldementing Techniques---> 375 Amp BBY

Intro to weld:
Material prep

1. First identify the material you are welding as each material has different procedures
2. Let's start with steel,
    a. We weld mostly 4130 chromoly tube; chromoly has mill scale from the manufacturing process that needs to be removed from the top layer of welding, failure to do so will result in contamination in the weld and will make for a weaker weld
    b. To remove the mill scale you must use an abrasive such as the wire wheel, or scotch-brite pads.
    c. The metal should no longer be gray and have a nice shiny finish to it
    d. Your metal is now ready to weld
3. Now let's move on to aluminum
    a. Aluminum requires a more intensive cleaning process than steel since it is more prone to contamination within the weld.
    b. Most of are aluminum part are cut on the water jet and will contain garnet in the edge of the weld. Garnet will contaminate your aluminum welds and make for a more difficult weld and a weaker joint.
    c. To remove the garnet you must file down the edge of the part until shiny
    d. Now that the garnet is removed you must now clean the part with a scotch-brite pad to remove any surface contamination of the metal
    e. Once done you should wipe down the surface with acetone to remove any remaining contaminant's
    f. Not only will you need to wipe down the part but also the filler rod you will be using.
    g. Your aluminum is now ready for welding
4. In general these are the practices you should follow for the majority of the parts we weld here. While on occasion we weld different grades of steel the general procedure remains the same. While we weld more metals than just aluminum and steel the other metals will be discussed further on in the guide

Torch Setup:
Torches come in a wide range of sizes, shapes, and use different "Consumables"

Consumable- Items that wear over time and you will constantly be changing/ adjusting and changing out
Ex…
Tungsten, Welding Cup, Gas Lens, Back Cap, Collet Body

The torch is the part of the welder where all the consumables go onto. Please note there are 3 main types of torches you will see in our shop.

Ex…
Series 9 (Limited to 125 Amps)
Series 17 (Limited to 150 Amps)
Series 18 (Limited to 350 Amps)

Next up is the back cap

The back cap as the name implies, screws into the back of the torch. Its main purpose is to seal the torch and stores your tungsten based on length. The shorter the back cap the shorter the tungsten must be but also the smaller overall size the torch will be. This allows for greater maneuverability and can get you into some tight places. Keep in mind that the back cap threads are dependent on torch size. 17/18/26 all can share consumables as well as 9/20

Now to move on to collets

Now to move on to collets 

These hold your tungsten and allow the current to flow through the torch handle and into the tungsten. The important thing to remember here is that depending on the thickness of your tungsten that will determine the size of collet that you will need. There are 2 types of collets including wedge and split collets, some argue that wedge collets hold a tighter arc but they are a bit more expensive than split collets

We can't forget about Gas Lenses  

Above can be seen 2 different types of gas lenses
The Bronze looking one is known as a standard body and has holes on the side allowing argon to flow out and onto your material.
The other one is known as a stubby gas lens. As a personal preference we have switched over to gas lenses due to a more compact size, This is a personal preference and some argue that Standard bodies work better. Find the one you prefer, with welding it is important to remember that there are many ways to weld so find the way in which you are comfortable. For us that means Stubby Gas Lenses.

Last but definitely not least Welding Cups   

Welding Cups come in various shapes and sizes as well as material, above you can see a few cups that we most likely have around the shop. The pink is a standard alumina cup, these are great for ac and dc welding and are usually the cheapest available cups, the white is a furick cup, furick cups are expensive but offer a much slimmer package they also use smaller gas lenses. Edge cups are le crème of le crop they are either made of glass, pyrex, or quarts. The Quarts cups can handle AC-DC welding and also use gas lenses.

This is just step 1 of cups step 2 goes into which sizes are used for what materials,

A size 4-8 is recommended for aluminum to decrease white oxidation line on material

A size 8-12 is recommended for Steel and this is what is mainly used on chassis welding and tabs

A size 16-18 is used for Titanium and sometimes stainless steel Keep these cups to exotic materials as they use more argon.

As a rule of thumb your gas flow should be 2.5x the size of your cup size so a size 8 cup uses 20 CFM
Stick-out is also based off the size of your cup, the rule of thumb here your stick-out Is cup size/ 16 in inches for a size 8 cup you should have 8/16ths or 1/2 in of stick-out. This is a rule of thumb but generally stick-out can allow you to have better visibility in most areas. In dire situations a size 18 cup will give you the most stick-out and might be necessary

And know you know how to set up your torch

Machine Setting
There are a couple of settings that you will be changing regularly when welding such as amperage, polarity, postflow/preflow . While our machines allow to change more settings there is no real need to change them.

Amperage:
Amperage is the amount of "heat" you are putting into a part the higher the amperage the more heat you will put into a part. The general rule of thumb is to use 1 amp per thousand of an inch of material thickness. For example if you are welding a part with a thickness of .045 you should use around 45 amps. Now this rule does not have to be followed but it will give you a good starting point of where to set amperage. As we move into more advanced joints the material thickness will vary so you will need to be able to control the foot pedal well. Speaking of foot pedals, the foot pedal connected to the machine allows us to vary our amperage and will have a maximum amperage to what you set on the machine. As you get better at controlling the foot pedal the need to change amperage on the machine

will decrease as you will be able to weld most materials with the same amperage setting on the machine.

Polarity:
Our machines have two settings for polarity, AC and DC. DC is used to weld steel, stainless steel, titanium and various other metals. AC on the other hand is used to weld aluminum and various other metals we don't weld here. In general Dc does not have many settings you can change, on the other hand AC does; With AC you can change the frequency, balance and waveshape, well get more in depth with what each of those do later on.

Postflow/preflow:
Post flow is the amount argon you will have after you finish welding. This is critical as having argon flow when done welding will prevent oxidation of the weld and will therefore make a stronger weld. Not only does this prevent oxidation of the metal but oxidation of the tungsten. Preflow is the same thing as post flow but come before an arc is struck. Pre flow will help make sure that there are no contaminants in the air surrounding the material. Some metals don't require as much post flow as other aluminum for example does not need much post flow on the material itself but is need to cool down the tungsten, metals like titanium require larger amounts of post flow as oxide will for if the metal is not covered properly

Argon/Cups

Filler Material

PPE Requirements

Welding Hoods com in many form factors but as long as you are wearing one while you are welding that is the important part. The two big distinctions are auto-darkening and fixed shade. Auto darkening hoods must be set to weld mode before you begin while fixed shades are always dark thus making them a bit harder to use but they may be easier to fit in hard to reach areas, they also tend to work better in the sun.

All welders use gloves but there a few different types. Mig gloves are the thickest and resist the most heat while covering up your sleeves the most but they are the worst in terms of flexibility. Tig gloves come in thick and thin varieties depending on how long you plan to weld for it may be better to get thicker gloves in our case we go with the Furrick TIG Nasties or defiant metal goat skin gloves these tend to be thinner and aimed towards flexibility. *Gloves will prevent the torch from shocking you* not wearing gloves may results in the torch shocking you if you are also touching the grounded surface.

Small note METAL THAT JUST GOT WELDED IS HOT do not touch it and always wear long sleeves, FR Shirts and use fiberglass pads if you are grabbing the metal use pliers. Steel can still be hot even 10+ min after welding use caution.

Welding plan

Friday, July 14, 2023 1:12 AM

Get person welding. Look for consistency in welds and them move down in thicknesses to gain more control.

A consistent weld should be:
Good pattern
not too big of a heat affected zone.
Weld should mostly penetrated, as the thickness goes down penetration should become easier and more evident in the weld.

When first training a welding one thing that the Trainer should look for is a good torch angle and be sure that it's not too steep and this could lead to problems welding. Torch height is also important to keep consistent.

Good technique with filler rod should include keeping the filler rod at a proper distance from the weld puddle and not adding an excessive amount of filler to the weld as this will lead to too tall of a weld. The weld should remain mostly flat throughout.

The key step when training someone is to make sure they know why they are doing what they are doing and what changes that they are making are having an effect on their welds. If they are being inconsistent its good to ask what changes they made, were making the welds look better or worse.

Sheet of a thickness that not too thick but not too thin should be used when first training a welder. .070 works well for starting some one off

As the trainee becomes for comfortable with welding consider moving to tube welding.

To start off have them weld tube ends together as this is more difficult to do and will help move around tube.

Archive

Wednesday, July 12, 2023 5:45 PM

This is all the information in the old OneNote (KS6C-E) :D

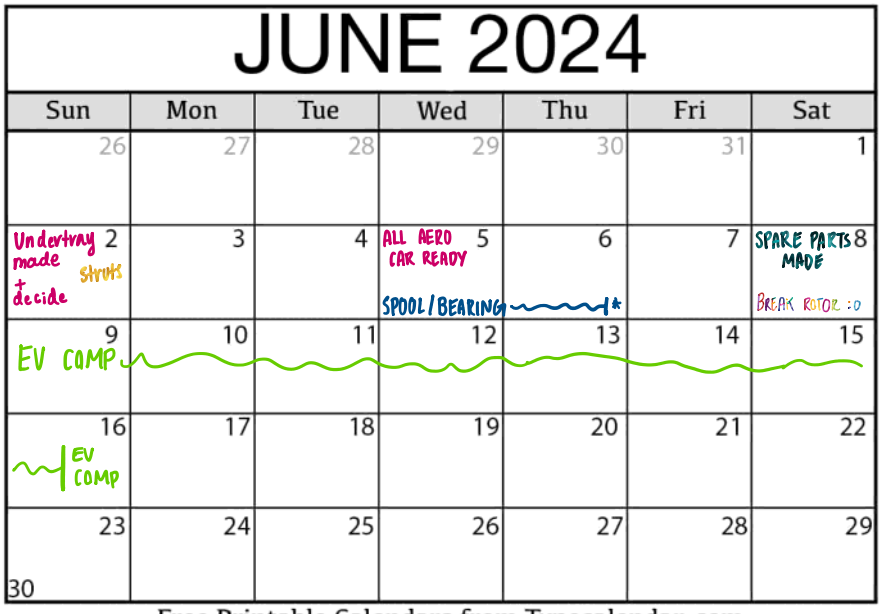
Now - EV Comp List

Monday, May 27, 2024 7:18 PM

Needs
- [ ] - 2x Front (10 tooth) sprocket
- [x] - 1x Front Sprocket adapter
- [ ] - 1x Bearing Carriers (L/R)
- [ ] - 1x Spool (Old)
- [ ] - 2x Rear Struts (face to final length, drill, tap)
- [ ] - 4x Rear Strut Inserts (CNC, drill, tap)

Undertray
- [x] - 5/31 get cross braces on jacking bar (via Marco)
- [x] - Re-drill holes on undertray mounts (before Sunday)

Wants
- [x] - Break rotor inserts? (24)



Free Printable Calendars from Typecalendar.com

Now - IC Comp List

Monday, April 15, 2024 4:39 PM

List of things needing to be manufactured, during the main meeting the priority of these items will be discussed with the team, as for what needs to get don't first

IC- header bungs
IC - Uprights
- FL
- FR

IC - Motor mount right side
IC - front steering pickup (should be done w /upright)
IC - Toe rod tab/mounting
IC - front sprocket? (spare)
Dif ration/redesign?
IC - pedal box needs redesign/updating
IC - throttle Bracket?
IC - Diff carieers (Can they go on car ??)
IC - Do we need anything for clutch?
IC - do we have enough shims in case we lose some during before comp?

IC Priority
- Throttle by Fri 19
- Bungs by Wed 24
- Waterjet: shims & Dif/bearing carriers @ GT Tue 23
- Dif sprocket just before comp

EV Priority
- Front Sprocket til Plate CAD Done
- Plates
- WJ sprokects & plates if possible

Would like to have have before IC
EV- Motor mount plate
EV- Bearing carrier plate
- Will have to be machined anyways, so maybe worth it

EV - Front sprocket
EV - output shaft if not useable

EV- spool :skull:
EV- rear sprocket
EV - Upright
FL
FR
EV - Upright Pickup
EV - Swap and reweld rear CA
Motor cooin fiting

EV sprockets
order of priority: - Jonathan
10 tooth front qty (1)
16 tooth front qty (1)
37 tooth rear qty (1)
16 tooth front qty (1)
10 tooth front qty (1)

and then 428 parts, double confirm on these if chill
12 tooth front qty (1)
45 tooth rear qty (1)
11 tooth front qty (1)

CAD
Do we want new cad???
Should update the spline to have the press fit mentioned, or ya know, a drawing....
Check thickness of sprocket teeth and that it's not too small
New Math??
New Design??

BEFORE EV COMP (in order of priority)
- [ ] 10 tooth (x2) & 16 tooth (x2)
  - [ ] CAM
  - [ ] CNC First side
  - [ ] Cut on bandsaw & finish on manual lathe
- [x] EV 37 tooth rear sprocket
  - [x] Turn down to 0.227 overall thick
  - [x] 0.130 Tooth
  - [x] Halfway down/0.048 either side
- [x] Clean up sprocket spacers
- [ ] Front uprights
  - [ ] Left
  - [ ] Right
- [x] EV Bearing Motor Plate (might not need)
  - [x] Clean up sides
  - [x] Might need soft jaws?
  - [x] CAM
  - [x] CNC bearing side & get overall thickness to size
- [ ] Spool

GT DXF LIST (in order of priority)

- [x] IC
- [x] Right Bearing Carrier
  - [x] Stock
    - [x] 0.5 alum
  - [x] DXF
    - [ ] Name:
- [x] Right Diff Carrier
  - [x] Stock
    - [ ] 3/8 alum
  - [ ] DXF
    - [ ] Name:
- [x] Chamber Shims
  - [ ] Stock
    - [x] 1/8, 0.06, 0.095 alum
  - [ ] DXF
    - [ ] Name:
- [x] Dif Shims (atleast 1/8 thick)
  - [x] Stock
    - [x] .25 alum
  - [ ] DXF
    - [ ] Name:

- [ ] EV
- [x] **Motor mount plate**
  - [x] Stock
    - [x] 1x 0.25" Aluminum
  - [x] DXF Name
    - [x] *KS7E motor mount w resolver NO lightweight*
- [x] **Bearing carrier plate**
  - [x] Stock
    - [x] 1x 0.5" Aluminum
  - [x] DXF Name
    - [x] *KS7E Bearing Side Motor Mount NO lightweight*
- [x] **Rear sprocket (37 tooth)**
  - [x] Stock
    - [x] 1x+ 0.25" Aluminum
  - [x] DXF Name
    - [x] *520 Pitch 37 Tooth Rear Sprocket NO Chamfer*
- [ ] **Sprocket adapter to bearing Spacer**
  - [x] Stock
    - [x] 1x 0.5" Aluminum
  - [ ] DXF Name
    - [ ] *Sprocket Adapter to Bearing Spacer*
- [x] **Front Sprocket (10 tooth)**
  - [ ] Decided to CNC whole part instead at a later date

Aero Stick

Friday, May 26, 2023 2:51 PM

Aero Stixk
- min wheelbase 1525mm
- max 700mm forawrd of wheel
- max 250mm behind wheel
- 1200mm max height for rear wing
- forward of front axle below 250mm
- everything else must not be higher than 500mm

Aero Block
- nothing within 75mm of tire

Mar 6-Mar 13

Friday, March 8, 2024 11:23 AM

Mar 6 - 13
TOOLING
- parting tool on CNC lathe is broken and needs to be replaced
- Manual Lathe tools are in Middle Cabinet in main
- All other tools are in Red tool box in O Machine Shop, key is on railing behind right mill, ALWAYS LOCK ONCE DONE
- If you have any questions or need more stuff to do msg me!! I am here to help so you don't waste hours fixing a problem I've probably already seen :)

Axle Endcaps
- 3D print part in PDM, make sure to test fitment before batch printing

SendCutSend
-Tabs need to be cleaned and bent
-To find part name PDM > KS7E/C > Manufacturing > SCS Order
-There are likely no drawings so have a subgroup lead double check direction of bend and bent line before putting on the press break

Header Bungs
- Stainless steel 2in round stock, needs to be turned down to 1.75 +-0.01
(for fitment in cnc lathe)
- Program for CNC lathe is in Manufacturing discord, again check fitment before batch running
- Will need to get clamped on manual mill and bored out

IC Bearing Carriers
- Center needs to be bored out for bearing pressfit, please have Bray/Mihai present when doing this

KS7 Shock Spacers
- Alum 0.65in round stock, on manual lathe needs to be center drilled, drilled to spec, and parted
- Qty:16, CAD in Manufacturing channel, Tolerance: height/ID: +-0.005, Everything else: +-0.01

Jacking Bar Insert
- CAD in PDM, need to be tapped w/ 1/4-28, check threads with rod end in left most red cabinet

Rear Wing Inserts
- CAD in PDM, need to have threads checked with rod end, if fitment is poor re-tap them

Waterjet
- Current List of Parts that need to be waterjet: EV Dash Tabs, PDU Tabs (qty for both cars), Seatbelt tabs, BOTS Bracket, Compressed Air tab, Pedal Box?? Bray??, Surlock tab (polycarb), Side panels for lid, Rim for top acc lid

Accumulator Fan Mounts
- New Acc fan mounts need to be printed & checked for fitment

Steering Pickups
- Alum 1" plate stock needs to be cut for qty 10 steering pickups
- Can try milwakee portable bandsaw or jigsaw
- Stock size 2"x2"x1" +-0.5

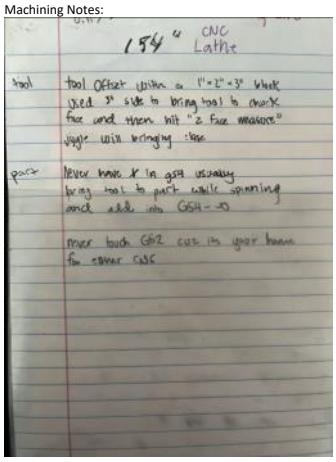
Jacking Bar Tubing
- Shrimple Vertical Bandsaw/Coping Tool Operations
- Stock is left of Chemical Cabinet, follow drawing specs & tolerances, if not called out +-0.01
- Jigs also will need to be made

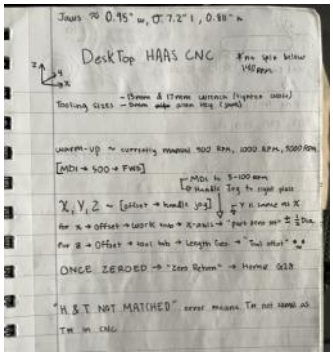
Aero Spars
- Some of the Aero spars are 3D printed, check w nathan & Project Proposal to get qty/toler/etc.

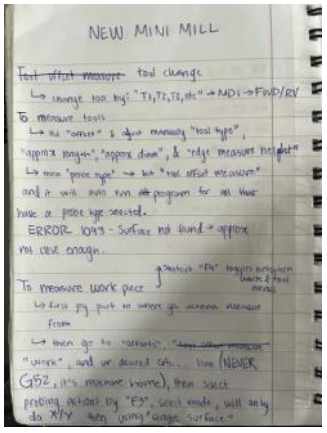
HDPV Spacer
- Polycarb 0.125" will need to be waterjet, then milled to correct thickness, check w/ Johnathan

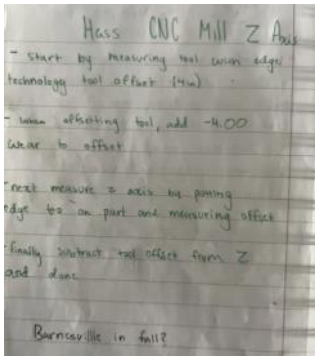
Heat Sheild
- Cut side pieces for heat sheild out of 0.03 sheet stock on vertical bandsaw
- Can print 1:1 ratio drawing and draw onto stock using calipers, can also glue drawing to stock as guide lines
- Tolerance: + 0.1 bc welded

Machining Notes:

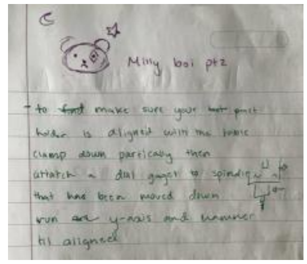








Tools I like for manual lathe:

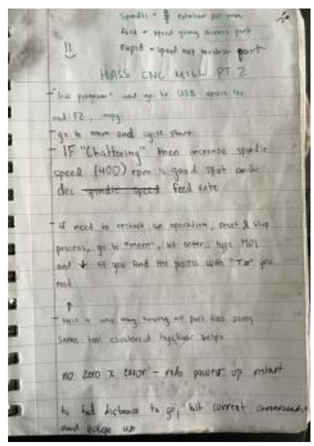


Milly boi pt2

- to make sure your part holder is aligned with the table clamp down particaly then attach a dial gages to spindle that has been moved down run an y-axis and hammer til alligned

Manual Mill

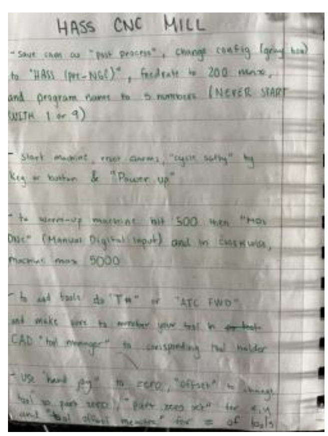
- if you can't move axis check locks



HASS CNC MILL PT 2

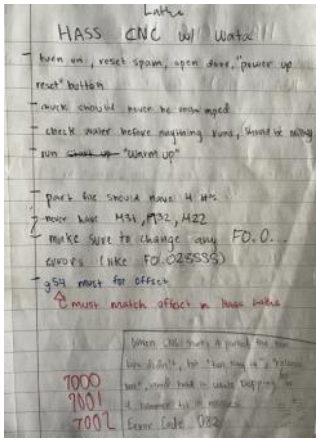
- go to mem and cycle start
- IF "Chattering" then increase spindle speed (400) rpm is good spot and/or dec feed rate

no zero x error - redo power up restart



HASS CNC MILL

- Save cam as "post process", change config (gray box) to "HASS (pst-NGC)", feedrate to 200 max, and program name to 5 numbers (NEVER START WITH 1 or 9)
- start machine, reset alarms, "cycle safety" by key or button & "Power up"
- to warm-up machine hit 500 then "MDI DNC" (Manual Digital Input) and in clockwise, machine max 5000
- to add tools do "T#" or "ATC FWD" and make sure to number your tool in CAD "tool manager" to corresponding tool holder


Lathe
HASS CNC w/ Watc
turn on, reset spam, open door, "power up
reset" button
check chuck is engaged
check water before beginning runs, should be
run "warm up"
part 6in should move 4 in
more than M31, M32, M22
make sure to change any F0.0..
errors (like F0.025555)
g54 must for offset
must match offset in
7000
7001
7002
Error Code 082

Tuesday, October 17, 2023 7:16 PM

Manufacturing time line:

Build end march 1st?

What are the big groupings?

Date on calbder
Whats require of them

Machine shop debackle

Know our priorty of what to manufacture

Know what to manufacture:

Known to make:

Acc mounts
Upright
Chassis
Acc lid
FW
RW
UT
Mounts
Aero Hardware
Headers
Dif carriers
PDU cover
EV dash cover
Switch pannel
Pedal box?
Bus bars
Acc cooling?
Throttle bracket
Axle end cap
Jacking bar
Dash box (non ev)?

Think about time line:
TSAL
MDB
PDU V2
AVI
Ev dash
VCU

Seat
IC firewall
Ecu mount
Floor pan

Gona be problems:
ETS
Intake test
Alignment tool

Deadlines as tight.
Pm for tracking.
Checking parts what needs to be made.

Lost items in the transfer:
List all items on old car
List all items in CAD

Aerodynamics
- Upper Mainplane Mold
- Bottom Mainplane Mold
- Upper RW Mold
- Bottom RW Mold
- Firewall Mold
- EV Undertray
- UT Mounts (on the undertray & on car)
- FW Tabs
- RW Tabs
- EV Jacking Bar
- FW Mounts
- RW Mounts
- RW Spars
- FW Spars
- Jacking bar tabs

Rolling chassis:
- Uprights
  - Pickups
- Steering pickup
  - Tie rod insert (lathe off old tube, put on new)
  - Adjustable toe plates
- Chassis Jigs (critical area, 3D others)
- Control arms
  - Spherical cups
  - Jig for alignment (can be MDF)
  - Control arm tabs
  - Control Arm triangle plate
- Shock mounting tabs
  - Welded insert
  - Aluminum insert
- Need to find bell cranks
  - Bronze insert
- Steering rack
  - Bronze Spacer (Tooling Wear Offset)
  - Chassis Inserts for yolk plate
- Wheel speed trigger wheels (on inside wheel/steel)

- Control arm Jigs, acc slats, MDF, Arch Tools, 5-Axis
- Waterjet: Toe plates, control arm tabs, shock mount tabs, chassis jigs, triangle plate
- CNC Lathe- tie rod insert, sphere cups, welded inserts, brass insert, brass spacer, chassis inserts
- CNC Lathe/CNC Mill/Waterjet/bandsaw - Uprights & pickups

EV:
- Acc Box (Bent)
- Lid (bent)
- Acc wooden slats (MDF)
- Acc mounts (CNC Mill/WJ)
- Acc battery slats
- Acc tabs
- LV Boxes???? (3D Print)
- LV Batt Box
- E-Button Tabs
- Head rest tabs
- TS/LV Switch plate tab
- Catch can tab
- Radiator Tabs
- Motor Tabs
- Body push button tabs
- Start button tab
- Steering wheel e-button Tab
- TSAL tabs
- Floor pan tabs (front & rear)
- Seat belt tabs
- Buzzer tab
- VCU tab
- Anti-Intrusion plate
- Pedal box, pedal box slot bracket, pedal box tabs, petal face
- Steering rack tabs
- PDU box tabs
- Grounding Tabs
- Inertia Switch Tab

Outboard buble:

- Urpight
- Puckups
- CA S
- New BC bushings
- CA welding jigs
- Spherical cups

Pedal box:
Main Hooks
Tube Frame inserts
All pedal tabs
face

Acc:

Top

Lower

Box
- Slats
- Floor
- Outside
- Wood inserts

Mounts
- Insue
- Outside

Cooling
- Check tolorance
- Drawings
- Methoid of manufacture

Lid:
Lower Lid
- DXF
- DRAWINGS
- assembley

Upper Lid

Drop a list of things I alr know to make

4 hr jet clean up

Talk to mihai heils abt Nov 2

4x4 plate for critical jigs

New brass

Chromoly hardened

A36 petal box

Lid questions
How is the top box gonna be made
Is that hanger printed

Rolling Thoughts

Wednesday, January 10, 2024 7:49 PM

Tie rod in front, toe in back

Rolling Chassis

- Uprights (Qty: 8 min)
  - CNC Mill
  - Have stock for max 10
- Soft jaws for Uprights (Qty: 2)
  - CNC Mill
  - We got blanks alr
- Upright Pickup (Qty: 8 min)
  - Waterjet to cut stock, CNC Mill
  - 1" 6061 Alum Sheet
- Steering Pickup (Qty: 4 min)
  - Waterjet out stock, CNC Mill
  - 1" 6061 Alum Sheet
- Tie/Toe Rod Shims (Should have enough)
  - WJ part
  - Sheet metal
- Rack Mount Tabs (Qty: 4)
  - WJ & Bend
  - 0.065" 4130 Steel Sheet
- Steering Bushing (Qty: 2)
  - CNC Lathe w/ tool wear offset
  - 1" Inprego Bronze Tube
  - Not in CAD
- Chassis Mounts - CA, Toe/Tie, Shock (Qty: 34)
  - WJ & Bend
  - 0.050" 4130 Steel Sheet
- Bellcranks Bushing (Qty: 8)
  - CNC Lathe w/ tool wear offset
  - 0.50" Inprego Bronze Tube
- CA Triangle Plate (Qty: 8)
  - WJ
  - 0.050" 4130 Steel Sheet
- Shock Insert (Qty: 12)
  - CNC Lathe
  - 0.50" 6061 Aluminum Tube
  - CAM'd
- Motor Tabs (Qty: 4)
  - WJ
  - Can be delayed, no motor
  - 0.25" 4130 Steel Sheet
- EV Rear Shock Tabs (Qty: 4)
  - WJ
  - 0.05" 4130 Steel Sheet

Part Breakdown:

- CNC Mill = 6 Parts
- CNC Lathe = 3 Parts
- WJ = 9 Parts
- Bender = 2 Parts

*excludes all WJ tabs that aren't critical for chassis rolling & all pedal box parts

Minimum Viable:
Parts needed for rolling chassis, but reusing old components

- Steering Rack Mounts
- Steering Bushings
- CA Triangles
  - Fronts
  - IC Rear
  - EV Rear
- EV Rear Shock Tabs
- Bell crank tabs
  - Fronts
  - IC Rear
  - EV Rear

Water-jet Issues

Wednesday, November 29, 2023 5:56 PM

- [ ] Wip Joint leak
- [ ] On head valve leak
- [x] Air leak in water height controls
  - Lines were run incorrectly
- [x] Broken Nozzle
- [x] Old contaminated garnet
  - Dumped
- [ ] Plumbing for drain/filter
- [x] Extension cords for 120V items
- [ ] Jet stream is poor

Manufacturing To-Do

Tuesday, February 27, 2024 4:27 PM

IC

In order of assembly…

- [x] Remove ATS tabs from sheet and label into baggie
- [ ] Clean edges & bend if needed
- [ ] Weld Toe Rod/Tie Rod Tabs
- [ ] Lathe Shock inserts
- [ ]
- [ ] Put old suspension on car
- [ ] Weld Seatbelt tabs
- [x] Machine new steering spacer)
- [x] CNC front motor mounts
- [ ] Weld on new motor mounts
- [ ] Cut remaining heat shield pieces on vertical bandsaw/jigsaw
- [ ] Weld PDU Tabs
- [ ] Weld Dash Tabs
- [ ]

EV

In order of assembly…

- [ ] Remove ATS tabs from sheet and label into baggies
  - [ ] 0.25 stock
  - [ ] 0.125 stock
  - [ ] Busbar stock
  - [x] 0.065 stock
- [ ] Clean edges & bend if needed
- [ ] Weld Toe Rod/Tie Rod Tabs
- [ ] Weld Rear Bell crank Tabs
- [ ] Weld Rear Shock Tabs
- [ ]
- [ ] Put old suspension on car
- [ ] Weld Seatbelt tabs
- [ ] Machine new steering spacer (might be waiting on stock)
- [ ] Cut spacers for Acc welding (0.03) on vertical bandsaw/jigsaw
- [ ] Weld Acc Mounts & gussets together
- [ ] Weld EV Stop buttons to Chassis
- [ ] Weld Dash Tabs
- [ ]

Rtrackin KS6

Sunday, March 3, 2024 2:42 PM

- IC Chassis
  - [x] Finish Fully welding
  - [x] Prepare for transfer
  - [x] Weld
- IC Seat Belt Bar
  - [x] Cut and Cope
  - [x] Weld to Chassis
  - [x] Weld on supports
-
- EV Chassis
  - [x] Finish Fully welding
  - [x] Prepare for transfer
  - [x] Weld
- EV Seat Belt Bar
  - [x] Cut and Cope
  - [x] Weld to Chassis
  - [x] Weld on supports
-
-
- Acc
  - [x] Weld Box
  - [x] Mounts weld
  - [x] Jet Chassis Mount Tabs
    - Bend
  - [x] CNC Aluminum Mounts
  -
- Modules
  - [x] Assembly Test Module
  - [x] Test Module
    - Glue Clear piece on
    - ~~Wallow holes on messed up piece to make fit~~
  - [ ] Busbars
    - Order Copper
    - Jet
    - Bend
  - [ ] Test with Module Board
- Lid
  - [x] Bend
  - [x] Weld
  - [ ] Assemble internal components
  - [ ] Wire circuitry
  - [ ] HV Path
  - [x] Attach to Acc Box
  - [x] Fix bad holes
    - [x] Weld
    - [x] grind
    - [x] Re drill
- Circuits
  - [ ] Assemble
- E-Car Water Cooling
  - [ ] CAD
- IC Water Cooling Loop
  - [x] Need to order bungs
  - [x] Get tubing pieces from dyno
  - [x] Weld

- Fuel Tank
  - [x] CAD
  - [x] Water Jet
  - [x] Weld
  - [ ] Tubing
  - [x] Cap and flange
  - [x] Cut neck
  - [ ] Turn neck
  - [x] Make cap?
  - [ ] Get wire pass trou trasnfted
  - [ ] Add drainplug
  - [ ] Order neck parts
- Pedal Box
  - [ ] Need CAD
  - [ ] Mostly Water jet + bend
  - [x] Jet
  - [x] bend
  - [ ] Weld and assemble
- Bodies
  - [ ] Prepping Molds for lay-up
  - [ ] Lay-Ups
- Aero Molds
  - [ ] Glue Ups
  - [ ] Arc
    - [ ] Rear mainplate
    - [ ] RW E3 f & b
    - [ ] RW E4 f & b
    - [ ] Undertray?
- Rear IC Suspension
  - [ ] Need stock
  - [ ] Spherical Cups
  - [ ] Jig + Weld
  - [ ] Assemble
-
- Steering
  - [x] Weld in steering tubes
  - [x] Bushing
  - [x] Weld in Steering rack
  - [x] Columns
  - [x] Inboard to outboard assembly
-
- IC Brake Lines
  - [x] Need more hard line
  - [x] Need new soft lines
  - [x] Route in chassis
-
- Wiring
  - [x] Need wire (Ordered)
  - [ ] Finish Wiring harnesses
-
- Tabs
  - [x] Pneumatic Shifting Tabs
  - [x] Brake Light Tabs + Mounting
  - [x] Tsal weld in
  - [ ] Weld in seatbelts
  - [ ] Stick brake light on IC
  - [x] Starter button cad
  - [x] New master switch IC
  - [x] ~~Switch pannel EV~~
  - [x] Clutch pnumatic tab
  - [x] New head restrant tabs
  - [x] New master switch
  - [x] E-Car E-Stop mounts
  - [ ] Will be more tabs to be made

- [x] IC Front Engine Mount
  - [x] Transfer to new Chassis
  - [x] Cut and weld chassis side mount
    - 4th axis no work
- Log Headers
  - [x] Cut and re-weld
- Inverter Mounting
  - [x] Need to CAD a solution
  - [ ] Order isolators
- [x] Diper
  - [x] Weld Tabs
  -
- [x] Muffler
  - [x] Weld

Dash stuff
Dash tabs
Starter button tabs
Order starter button?
Cluth mounting in car

<u>To get to Rolling Chassis:</u>

- Steering
- Suspension
  - Jig + Weld Tabs
  - Transfer all EV
  - New IC rear CA, transfer rest
  - Bell Crank Bushings
- Brakes
  - Need Pedal Box
  - Need new lines for IC
  - Transfer EV stuff over (Practically New)

Misslist:
Jacking bar on ev car
PDU mount (EV)
Push bar in totaly

Ic jacking bar:
- [x] Tube cut
- [x] Flat sides
- [ ] Welded insert

Prep work:
- [x] Ensure AI plates are ready
- [x] Head rest foam cut
- [x] Glue head rest
- [x] Make covering

Aero:
Inserts
Other aero inserts

Arch speed and feeds

Tuesday, January 17, 2023 8:56 PM

Foam

Flat end mill
1200 in/min

3in step down

Ball
1200in/min
.1 cusp

MDF

Flat end mill
800-1000 in/min

.5 in step down

20% step over
Up to 70% if using short tool

Ball
900 in/min
.05 cusp

Long straints will get chatter if long stickpout

Operations:

Do not use 2d contour on onsrude.

Wing Molds
3d adaptive
Scallop

Body
Face
3d adaptive
Contor (ball)

https://www.the-carbide-end-mill-store.com/m5/778-2712--3-4-ball-end-mill-xx-long-length-778-2712-2-flute-30.html
Potential for body rough and finish

Copy and replace with this.

N120 G92Y(@YAXG92)
N125 G16XY
N130 G27
N135 G40
N140 G70
N145 G80
N150 G90
N155 G94
N160 G00 G79 Z(@ZPARKP1)
N165 G00 G79 A0. C0.
N170 (UAO,1)
N175 G70

Delete all UIO and TCP commands

Control arms

Monday, December 27, 2021 8:14 PM

The spherical holder are made on the CNC lathe

You must check and use the ware offset to get a good press fit when the product come out the lathe. You should not be able to insert by hand nor shoud it require any force on the press gauge

The tubes are purchased and notched by VR3

The jig is a flat plate with a fixed hole for the CA outer joints and 4 laled holes on each end of the arms angle
The plate must beable to be flipped to do both Left and right arms.

Turned inserts are then placed in the holes that hold the spherical housing at consistent heights

To start weld prep we clean the shperial housing and end of the tubes on the wire wheel or with scothc bright.

Next we take the end of the arms where only one tube go to the spherical and crimp them using the shapre line in the crimping tool. A dead blow or hydraulic press work best. It is critical to ensure the notch is oriented correctly.

Next we use the jig to place the spherical holders (all3) and place the tubes in the correct configuration. I sometimes use a filler wire to space the tube exactly in the middle or offset some what down.

I always start by tacking the non notched tube starting from chaissis side. When the oposing tube starting fomr chassis side. Then flip the arm and tack the back side.

When fully tacked put back on jig to verify.

Next full weld both chassis side and upright side. To weld the middle and side I use the inverse v block to hold the arm as 30deg angles to access the hard spots.

I regulary weld at 60amps here using 3/4 to 1/2 power.

If the arm is a push or pull rod arm next I remove the stickers and clean the triangel parts.

I weld them on at low amps perhaps 40ish and alternate to not cook the arms.

DO NOT weld on the rod connection. This is done last and then the suspension is assembled.

To press the arm use sockets to ensure loading only on the outer race. Check each joint to ensure no speapage of the teflon lining is apparent and that the joint is not bound.

How to use the bender

Wednesday, December 8, 2021 8:30 PM

Aquire sheet to bend

Mark bends

Make either inside or outside of bend radius **not center of bend**

Set bend order and mark side of fold

Check that all bends fit in box and pan brake

Check the set radius of the bender

Insert part to desired bend line

Ensure sheet is square if possible

Recite desired bend angle

Bend to half of desired angle and check

Proceeed and check intill desired number is aquired

Keep in mind spring abck of materieal.

O-building

Tuesday, March 21, 2023 6:13 PM

Electrical Table

Machine Type	Input Volts (VAC)	Full Load (A)	Requested Amps (A)
Mini Mills	220	25	30
ST-10	220	40	45
TM-1	240	40	45
Vectrax CT	220	?	?
OMAX MAXIEM 1515	480	?	?

List of Machines
- Mini Mill (1)
- ST-10 Mill (2)
- Vectrax (1)
- TM-1 (2)
- OMAX (1)

List of mach we are missing

Vertical band saw
Horizontal band saw

To add to cad:
Water jet
Cooler (for jet)
Pump
Drain box

Plan for sump pump

Coates email
- Mention manual lathes and that possiblity
- Cover bases before we do the enclosed layout
- New cad with both mini mills
- Will inform with when we have decided on new manual machines

Keep all the ccs

Smol items:
Vice
Trash cans
Cabinet
Tool boxes
Smol surface plate
Tool grinder
Belt sander
Stock storage

Spring Manufacture List (better)

Friday, February 10, 2023 1:10 PM

Item	CAD/Drawing in PDM?	Quantity	Manufacturer	Done?
VCU adapter & RTD buzzer Tab	y	1	Mihai	Y
Pot arm retainer tab	discord	5	Abri	y
pedal box axial pivot	discord	2	Peter	Y
Pedal box bushing for pot	discord	1	Justin	y
Muffler Mount and plate	Y	1	Marco n Alex	Y
Bearing Carriers	Y	1	Abri	Y
Breaklight EV car	y	1	Abri	Y
Pull rod testing inserts	?	?	Ethan	y
Breaklight tabs EV	y	2	Marco	y
Wing 4 element	discord	8	Tyler	y
M6 safety wire bolts	n/a	12	Tyler	y
Shock Bushing	y	1	No stock	
Bell Crank Bushing Insert	y	2	No stock	
Steering Column Spacer	y	1	Casey	y
Steering column redo	y	1	Emil	y
MTS Machine Adapter	discord	2	Abri/Casey	y
MTS to Carbon	discord	1	Casey	y
Test Material to Endlink	discord	5	Abri	y
Trophy Track Waterjet	discord	3	Tyler	y

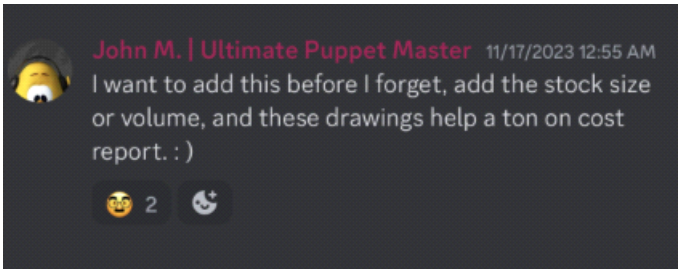
Metals Projects

Wednesday, November 22, 2023 2:06 PM

8:41 PM

- UT Mount: .090" A36 Steel
- ECU Mount: 0.05" Alloy Steel Sheet 4130 (4 tabs)
- IC Dash: stainless steel (4 tabs)
- EV Firewall: .04" A36 Steel
- EV Floor Pan: .05" A36 Steel (16 tabs)
- IC Firewall-.05" A36 Steel (2 tabs)… mat. For firewall?
- Aero Package: .125 aluminum (24 ribs)
- ETS…
- EV Front Wing Mount: 7 steel tabs, 6061 aluminum 1/8"
- Jacking Bar: aluminum 6061 t6 tube (bar and inserts)
- EV Rear Wing Mount: 1/16" 304 Stainless Steel (1 ft x 1ft), .25 OD x .215 ID 6061 – T6 Tube (48 in), 1/4" 6061-T6 Sheet (1ftx2ft)
- Headers:
- Diff Carriers:
- Rear Sprocket & Spool: Sprocket – ¼'' thickness stock aluminum 7075, Spool – 4'' round bar stock aluminum 7075
- PDU Cover: 1/16" Aluminum sheet metal, NO DRAWING FOR BAC PLATE OR TABS
- Acc Mount: 1" aluminum 6061
- Acc Chassis Tab: .125" alloy steel, .09" alloy steel
- Cooling loop tabs: .065" steel
- Lid: Alum .0125 (Main plate, sheet enclosure, enclosure shield, side cover)
- Busbars:
- Uprights:

Pdu cover tabs?
VCU tabs?



SCS Order

Friday, February 23, 2024 5:07 PM

***need dxfs and put in order form
***submit order 02/26

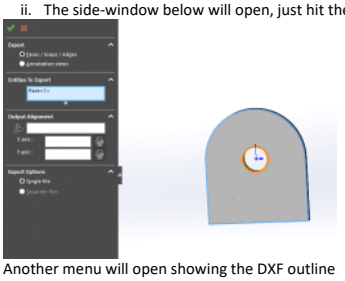
- [x] Spars
- [ ] Air tabs
- [x] 1x Water pump tabs - 0.050
- [ ] Pedal box
- [x] 1x Throttle bracket - .090
- [ ] Sprocket *
- [x] Aero tabs
- [x] 4x Header Flanges - 0.25
- [x] Firewall Tabs
- [x] 2x PDU backplate (IC)
- [x] Tsal Tabs
- [x] Catch can 2x
- [x] Ic kill switch
- [ ] Break rez/ bots bracket

Waterjet Guide

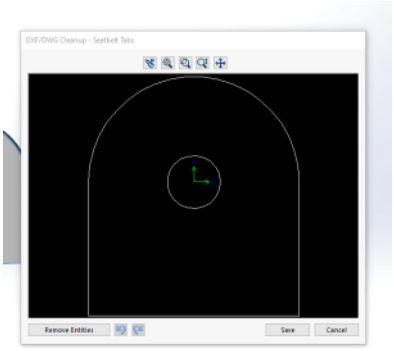
Part Design for Waterjet/Create a DXF:

1. Design your part
    a. Must be sheet metal part or designed in a way that a flat pattern can be cut out on the jet
    b. **Parts must be in inches** when DXF is made or it wont be sized properly when cut

2. Get a DXF File of Part (File type the waterjet uses)
    a. Right click flat surface, select "Export to DXF/DWG"
    b. Select where you want to save the DXF (Use a flash drive)
        i. Name the part, smart to include material/thickness in part name
        ii. The side-window below will open, just hit the check mark



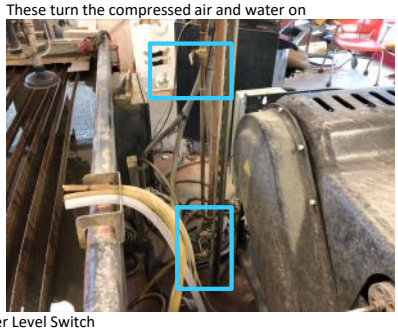
    c. Another menu will open showing the DXF outline
        i. Double check this to ensure it is the shape you want the jet to cut out
        ii. Hit save



    d. Once saved take the flash drive to the waterjet computer

The Waterjet: (Pictures and descriptions of waterjet)

- 
- Waterjet Computer

- 
- 
  - Controls the waterjet
  - Used to set up and run the DXF for the jet
    - Through the OMAX Layout and OMAX Make programs
- Air and Water Valves
  - These turn the compressed air and water on
  - 
- Water Level Switch
  - Controls the height of the water
  - 
- Garnet
  - Sandy abrasive that combines with the water to cut through material
- Garnet Holder
  - Stores the garnet
  - Uses the compressed air to deliver the garnet to the jet
  - 

- 
- Water Pump
  - Delivers high pressure water to the jet
  - 
- Water Pump Controller
  - Two dials that control the pressure of the pump
  - Keep the dials in between the sharpie lines
  - 
  - 
- Water Cooler
  - Cools the water flowing through the water pump
  - Without this the pump will overheat, causing damage to the pump
  - 

Using the OMAX Software:

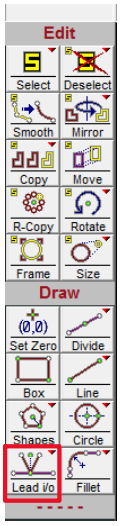
OMAX Layout
Buttons:

a. "S" = Select
b. "Q" = Quality , "1-5" , 1 is worst quality 5 is best
   i. Affects the speed at which the jet will cut

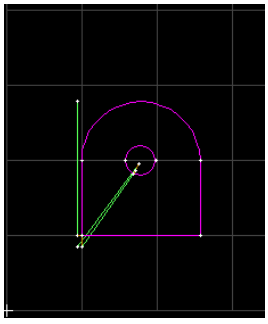
        ii. Higher quality = slower speed, vice versa
    c. "A" = All
    d. "D" = Deselect
1. "S+A" = Select All
    a. Must select all lines of a part before doing any other function
    b. When selected parts will turn yellow
2. "D+A" = Deselect all
3. "S+Q+A+3" = Select Quality All 3
    a. Selects the quality of the cut
    b. We use quality 3 for almost all parts
4. "M" = Move
    a. Once selected, will move the shapes around on the plane

Creating a Path:

1. Right Click "Lead i/o"
    a. Bottom left of menu

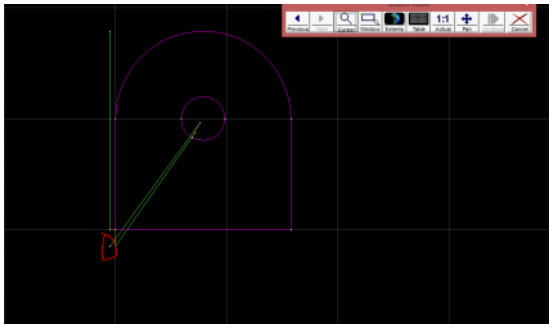


2. Press "Auto Path (Quick)"
    a. Will look like image below
        i. Green lines indicate lead in path

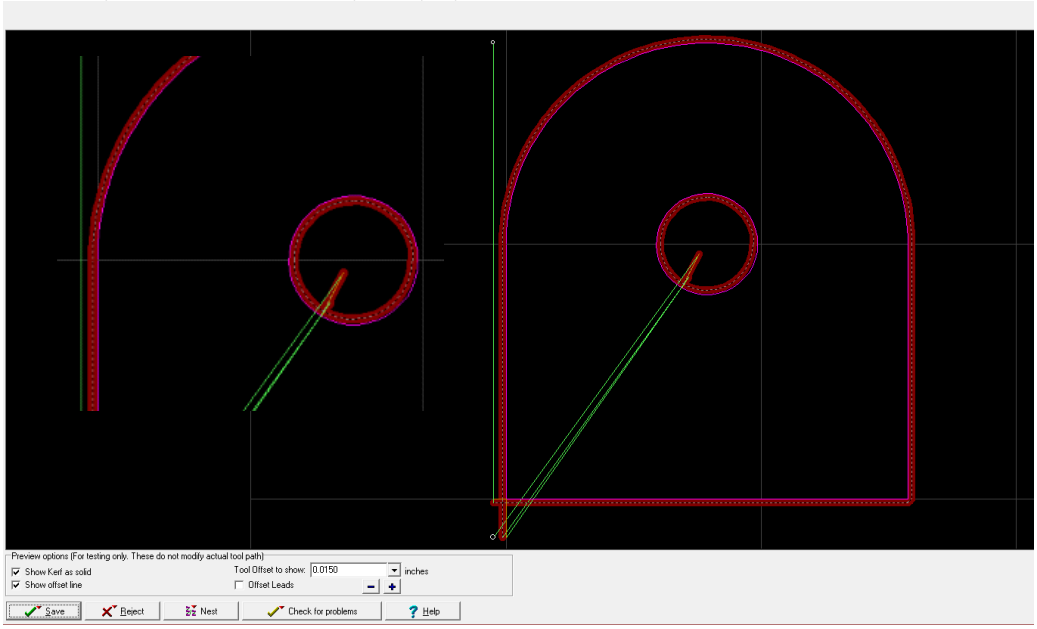


3. Right click "Path"
    a. Right side menu

    b. Select "Automatically Generate"
        i. Select the start point
        ii. Use the start point of the green line in the bottom left

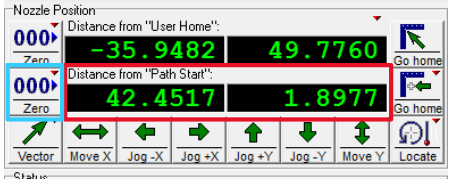


4. A menu will pop us showing the path the jet will take
    a. The path will be red
    b. Make sure the path is on the outside of the line of the outer edge of your part
    c. Make sure the path is on the inside of the line of any holes in your part



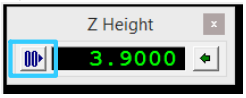
5. Once you've ensured the path is correct hit save

OMAX Make
Moving the Jet Nozzle:
Buttons:
    a. "Arrow Keys" = Move jet in direction of arrow pressed
    b. "Shift + Arrow Keys" = Move nozzle in direction quickly
    c. "1" = Moves nozzle down quickly, "7" moves nozzle up quickly
    d. "Page Down" = Moves nozzle down much slower, "Page Up" = Moves nozzle up slowly
Zeroing the Nozzle:
Zeroing = Setting where the water jet will start the path
1. Move the nozzle to a clear area with enough room for your part
    a. Keep in mind the start of the path is to the bottom left of the part
2. Press the zero next to the coordinate indicator
    a. The bottom set of coordinates indicate distance from start path (red)
    b. Zero x-y button is to the left (blue)

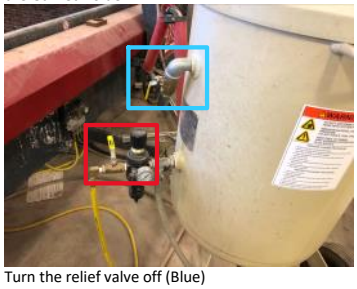


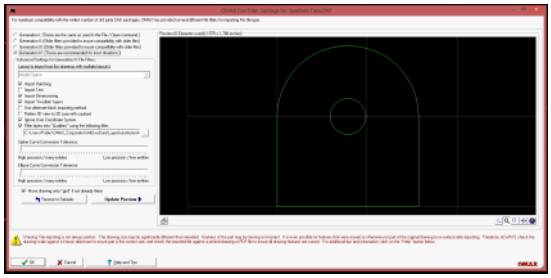
3. Place the gage on the sheet metal
    a. 

b. 
   c. Sets proper distance of nozzle from material
      i. Ensures proper cut
4. Lower the nozzle towards the gage
   a. As the nozzle gets closer to the gage use "Page Down" to move slower
      i. Ensures you do not crash the nozzle into the material and damage the jet
   b. Nozzle should be close to gage but not pinching it
5. Set the zero on the height
   a. Top left of the screen labeled "Z-Height"

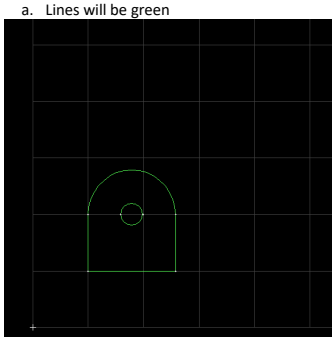


Setting Up the Waterjet:

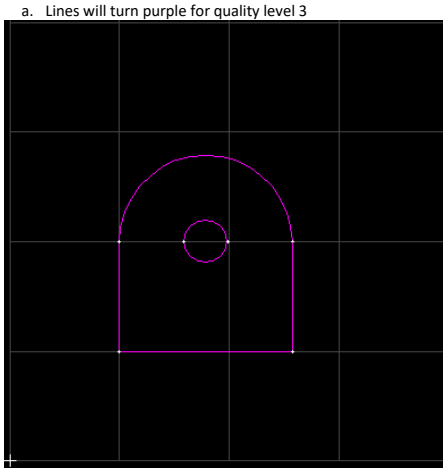
1. Plug USB drive with DXF file into the dongle of the Waterjet Computer
   a. Turn on the computer
   b. 
2. Turn on the compressed air
   a. The nozzle can be moved with only air and computer on
3. Go to the Garnet Holder
   a. 
   b. Turn the relief valve off (Blue)
   c. Pull on the plunger to create a seal
      i. 
      ii. As you pull on plunger turn on the air (Red)
   d. Give it a second and ensure that there is enough pressure so that the plunger will not fall back in
   e. Put the cover back on the holder
4. Open the OMAX Layout Software
   a. Go to "File"
   b. Select "Import from other CAD"
   c. Go to file location and select the DXF file
   d. Screen will look like this, click "OK"



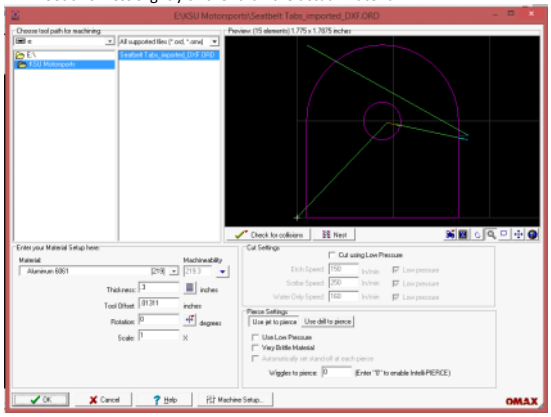
5. Once open position the DXF
    a. Lines will be green



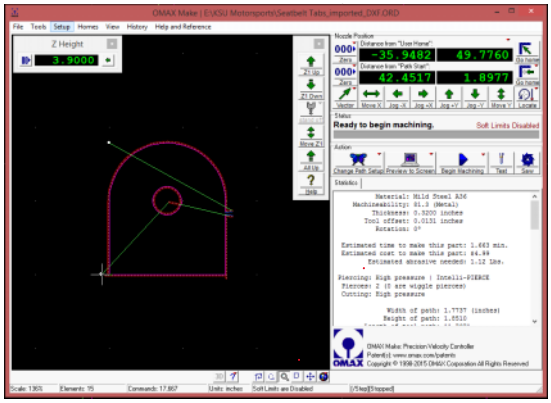
6. Select the quality
    a. Lines will turn purple for quality level 3



7. Create the cut path
8. Open OMAX Make
    a. Right side menu, right click "Path"
    b. Right click and press "Open ORD in OMAX Make"
    c. Set your material and thickness
        i. Set thickness slightly thicker than the actual material



    d. This software runs the DXF and is used to manually move the nozzle



9. On the control panel on the side of the computer
    a. Press the green button and the black one underneath it
    b. This is a safety feature, pressing the buttons shows the machine that it is safe to move
    c. 
10. Move the nozzle to the right, out of the way
    a. This gives you room to put the sheet on the jet bed
    b. Place the proper thickness of material on the bed
        i. Determined by your part
11. Place weights on the sheet to keep it from moving on the bed
    a. If sheet moves, your part will be messed up

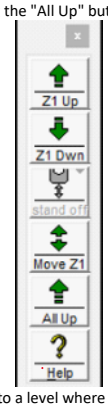
Cutting the Part:

1. Turn on the water (Picture of water flowing from tube)
    a. **Must turn on the water before turning on the pump**
2. Turn on the pump
    a. **Turning on the pump before the water will damage the pump**
    b. Two switches
        i. 
        i. 
    c. Hit reset on the pump controller
        i. Safety feature show pump it is safe to run

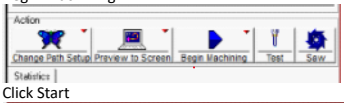
ii. 

d. Check the dials on top of the controller, make sure they're between the sharpie marks

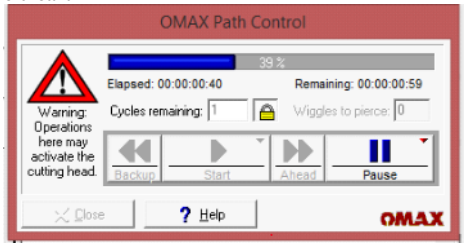
3. Turn on the water cooler
    a. Just need to turn the switch on
4. Go to OMAX Make
    a. Set your zeros
5. Raise the nozzle using the "All Up" button



6. Raise the water level to a level where it will cover the lip of the black cover around the nozzle
    a. If you don't raise the nozzle before raising the water level the nozzle may get clogged
7. Lower the nozzle using the arrow next to the Z-Height indicator (Pic)
8. Click "Begin Machining"



    a. Click Start



9. The jet will begin following the path and cutting the sheet metal

a. 

Shop Space

Tuesday, July 2, 2024 9:47 PM

Largest stock: 5ft by 5ft

Wide thin stock
Short heavy stock
Plastic stock
Tube stock

Soft jaws: 6x1x2 in
Lathe holders: 2x5x3.5 in

Fixtures and fixture plates
Parts done
Parts in progress

Garent bags: 20x10x3in

Current metal stock pile: 80x75x30in
Current plastic pile (not much used): 35x70x55in

Drill press: 22x70x24in x2 mach
Grizzly drill press take one whole wood table

Wood table tall: 30x60x38 tall (qty 6)

Lathe position 17 by 8ft from door and left wall
Can moved 5ft forward back side to side
Tables its on 30x100x33in

Mini mill 6ft out from wall, 12ft from front, 52in from each other

Desktop mills take up whole wood table

Westward tool box (66x41x20)
Husky small black (12x20x9)
Husky middle black (26x21x16)
Red husky big (18x44x44)
Red tool cabinet (24x60x38)
Old gray tool cab (61x30x40)
Tool carts (40x20x36 tall)
Lathe tool box tall (20x16x28)
Open silver tray (30x24x48)

Shop (24+18.5 long)
Electrical on left wall 16-20 ft from front

Mill 11ft from back, 8ft from left wall
Air line left of it

Enpack press 5ftx4ft in back left corner no move

Bender (40x48x48) footprint
Trash can 24 dia x 3 ft tall

Mill trash can needs to be 2ft