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MARCH 2020

Happy March!

Big Brother & Big Sister's February Event

Clay Sculpture Night

The Bigs and littles got creative with sculpting clay at this month's event. BBBS will be taking the next 2 months off. Click the link for the complete slide show. BBBS Slideshow

Facilities Equipment

3D Printer Changes – We obtained an old food dehydrator to dry plastics. In case you didn't know, a common practice in molding plastics is to dry the plastic for several hours before it is used. This practice should also be applied to 3D printing. You may have heard small popping/crackling sounds from the extruder as hot plastic is extruded. This is the moisture in the plastic boiling and bubbling as it comes out of the nozzle. Plastic which is not dehydrated could greatly reduce the layer bonding, appearance, and success of your 3D print.

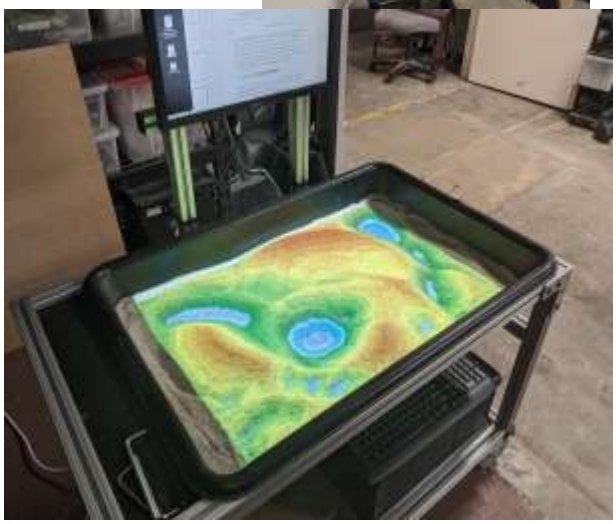
To dry plastic, place 1 or 2 spools into the dehydrator and set the countdown timer to a time recommended for your specific plastic (material chart is posted). This unit may be left on and unattended. After using a spool of plastic filament, always remove from the machine and

store it in the hydrophobic silver bags. Remove most of the excess air in the bag as you close the Zip lock. Do not leave a spool on the machine.

New Mobile Video Cart – As we all know, you can learn most anything from YouTube instruction videos. This includes good safety and use practices. We have created a Mobile Classroom to help instructors incorporate YouTube videos as part of their class materials. This computer and monitor can be used anywhere in the shop and by any instructor at Bridgewire. The cart is stored in the electronics lab.

New Augmented Reality Sandbox – Remember how much fun you had as a kid playing in a sandbox. Well this hi-tech topographical sandbox will be just as addictive to adults and mind-blowing for kids. We have built the first Augmented Reality Sandbox in the Reno/Sparks metropolis. The **hands-on sandbox exhibit** combined with 3D visualization applications was created by researchers at UC Davis.

Simply mold the sand by hand and the **landscape comes to life!** The sand is **augmented in real-time** with an elevation color map, topographic contour lines, and simulated water. Learn more and watch videos at ARSandbox. **This will be exhibited every Thursday Open House.**



AR Sandbox is the result of an NSF- funded project on informal science education for freshwater lake and watershed science developed by the UC Davis' W.M. Keck Center for Active Visualization in the Earth Sciences (KeckCAVES), together with the UC Davis Tahoe Environmental Research Center, Lawrence Hall of Science, and ECHO Lake Aquarium and Science Center. At Bridgewire there were several members that contributed to get this constructed and running. Thanks to all that contributed.

President's Corner

New Member Communication Tool – Bridgewire has always lacked a good communication tool. Several people don't use their email and others reject Facebook. We are implementing **Bridgewire Discourse** which is an open source Internet forum and mailing list management software application. It will be private and have only Bridgewire members as members of the forum. You were sent an email invitation from Jay Pfaffman on Feb 17th. The invite has a link with instructions on how to use **Discourse.** Already a quarter of the members are signed up. So please join ASAP. Jay Pfaffman is implementing the program. We believe this software will provide effective communication without the annoyance level of Facebook.

Quarterly members meeting – We held the quarterly members meeting on Saturday Feb 8th. We used a town hall format for this meeting. There was plenty of feedback about what members were looking for from Bridgewire. This information will be used in late March, when the Board has a special retreat meeting to decipher the inputs and create an actionable task list and adjustments to our strategic plan.

Organizational Growth – I was recently reviewing some of our records to see how the organization has grown. We have been in existence for 8 ½ years but grown only over the last 3 years. Our membership has increased 140% and our

cash reserves have increased 320%. I was surprised to see just how far we have come. This trend bodes well for fulfilling our mission to "**Provide a community industrial workshop for the practice and education of the industrial arts in woodworking, metalworking, electronics, and other fabrication technologies**". I want to say thank you to all the officers and directors that have contributed to this growth. - *President, Eric Bradford*

Omri's creative solution

Glider Rudder Lock

the problem to be avoided, the rudder deflected fully left by the wind

One common problem when occasionally parking and tying a glider (or an airplane) outside, is the rudder being swayed by the wind and especially by strong gusts. A good crosswind gust may slam the rudder up against the rudder stop (which limits the angular travel of the rudder). A really strong gust may even slam the rudder up against its stop so hard it may actually damage the rudder and/or its stop. Obviously not a good thing and I'd really rather avoid that expensive repair.

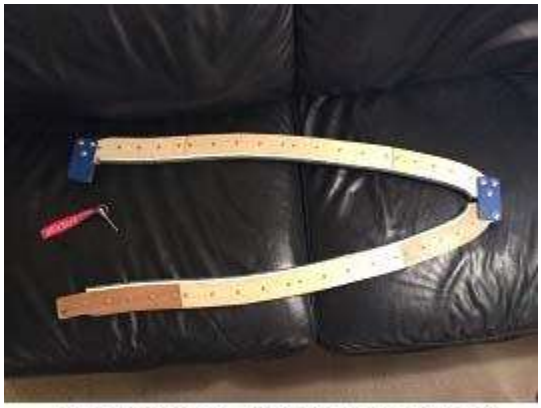
The best solution is to lock the rudder in its centered position via a gadget that fits over the vertical stabilizer and rudder. Unfortunately since my glider (like most gliders) uses a T-tail it's not quite that simple as I can't simply slip it on from the top down. Because of this, the rudder lock must be able to open for installation and have some kind of locking mechanism to keep it closed once installed. I ended up designing and building a rudder lock that is hinged at the front and opens like a clamshell and uses a cotterless key pin to lock it closed at the back. It was entirely designed via CAD (or as close as you can call Inkscape CAD) and mostly CNC cut using Bridgewire's laser cutter. One interesting challenge of this project was that the 1/2" thickness of the final shape is too thick to laser cut and the length of the final shape is over 3 feet long which is too long to laser cut in one shot. I ended up laser cutting shorter, thinner cut parts and bolting them together in a way to solve both problems. The shape of the airfoil to fit over, was roughly measured by hand, by tracing onto a piece of cardboard initially and gradually correcting for minor 1/8"-1/4"

inaccuracies with every iteration (let's just say I wasn't acceptably happy with the first or the second iteration).

It's built out of a combination of materials, however the main structural materials are 1/4" plywood, 1/8" plywood and 1/8" acrylic all of which were laser cut. The main pieces are assembled together using DIN metric machine screws, fender washers and elastic lock nuts I purchased at Metric Multistandard in Sparks. The blue end pieces (which can take serious torsional stresses when the rudder lock is opened and not properly supported) were built out of 10 ply of RA7725 bidirectional fiberglass (with fiber orientation at 45 degrees and optimized for torsion) laminated together with US Composites 635 thin epoxy. 1/8" laser cut acrylic was used in place of plywood on the front hinge and aft lock areas to prevent wood from rubbing up and chafing against the fiberglass end pieces when opening and closing. I also used small acetal laser cut bushings/spacers that accept the machine screw for the front hinge and at the back where it accepts the cotterless key pin, again to prevent any chafing against wood when opening and closing.

the closed rud

the closed rudder lock



The rudder lock opened and ready for installation

plywood parts fresh off the laser cutter

rear close up of the installed rudder lock

To protect the surface of the aircraft itself from chafing by the rudder lock, the inside edge is lined with indoor/outdoor carpet backed with 1/4" semi-rigid foam glued together with hot melt glue. The plywood pieces are protected from the elements with brushed on varnish along the edges and a sprayed on clear polyurethane finish elsewhere. I finished the composite end pieces with textured paint (to hide tiny air bubbles and other imperfections in the laminate surface) and blue spray paint matching my glider's trim color. Lastly, I 3D printed small caps that fit over the locknuts and the threaded shanks protruding

out of them glued in place with silicone RTV so there is really nothing to snag onto it when the rudder lock is in storage. .

the installed rudder lock

Craig's Corner

Solar SUNday, 2014. Showing 3 solar devices set up at the South door.
L to R, solar box oven, one of our large parabolics, and a small mirrored TV dish.
The TV dish experiment was to try to make Charcoal with the sun. Will soon learn that it does not work well in a glass jar. Results shown in the following photos.
Charcoal with the sun. Will soon learn that it does not work well in a glass jar. The results are shown in the following photos. But we had fun.

One sunny day we played around with whipping cream. While it is possible to make butter by putting cream in a jar and shaking the heck out of it, that's a LOT of work. Here shown is a small PV panel running a 12-24v motor with the shaker jar wired on. Worked quite well and saved some sore arms.
After making butter, we put some into solar cooker to make ghee.

Shown in pic L to R, quart cream, butter, cream, ghee. It was fun, and all off-grid

Solar SUNday in March

The first Solar SUNday Cook-off and pot luck of 2020 is scheduled for March 8

Celebrate the time change, bring munchies to share.

Noon—another Bridgewire Workshop on making and using the Ft2 solar cooker. Included materials and instruction to use it also as a solar still for making ethanol, hydrosols and essential oils. Also a look at the Solar Cyber Cooker.

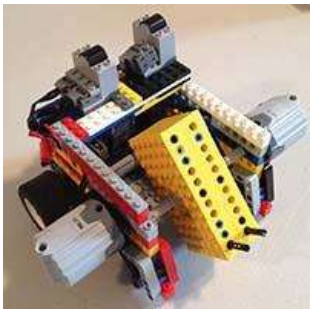
Daylong activity — making absinthe. Bring 1.75L of cheap vodka & we supply the herbs. Cost $10, 5 for herbs and 5 to the Bridgewire Solar Fund.

Nevada Inventors Association

The Nevada Inventors Association will host a meeting on March 4, Wednesday, 12 pm - 2 pm at the UNR Innevation Center (450 Sinclair Street downtown Reno; free parking).

We will have no lecture this time. We will have an open discussion on any topics related to the invention, such as your inventions, patents, trademarks, prototyping, licensing, and marketing.
We will also talk about future lecture topics, speakers and group site-visits; the NIA membership; and the time of the day for our meeting.
Coffee and bagels will be served

nevada.inventors.assoc@gmail.com



Reno Robotics Club March meetings
Robot Sumo Challenge

March 27th 4pm to 7pm the second match in a month for the Reno Robotics Lego Robot Sumo Challenge. Come on in and watch the action up close.

ARTICLES ALWAYS NEEDED!

The Newsletter

Things are looking up for the Bridgewire Newsletter, we're getting more and more interest in submitting articles, making the BWNL more interesting and relevant than ever. Thanks to Eric, Omri , Craig, John and Tia Spears for contributing to this month's issue. If you have an article in mind or just

a particular subject that you would like to see in the newsletter please email your entries to Lance, at lance@ipc-solar.com .

EDUCATION HAPPENINGS

New Classes for 2020

BBBS upcoming May workshop

The next Big Brothers and Big Sisters Event is scheduled for May 27th.The project is to be determined. For more information contact John at renoscuba1@gmail.com.

CAMTASIA video capture software class

Eric will show you how easy this software is to use, and show off some current Bridgewire video productions. Camtasia is very useful for making any video, from student presentations to corporate pitches and YouTube epics. Come in on March 7th or 21st for a hands on workshop.

Regular Monthly Classes and Equipment Safety Training:

- **1st Thurs – Welding Shop:** Safety Demo + knowledgeable user check off - by Lee Elliot
- **2nd Thurs - Laser Cutting:** Safety Demo + User Training.- by Eric Bradford
- **3rd Thurs - Wood Shop:** Safety Demo + knowledgeable user check off - by Roman Hruska.
- **4th Thurs - 3D Printing:** Safety Demo + User Training.- by Chris Spitler

Recurring Education classes and events:

- **CAD Class:** Learn 3D CAD modeling so you can make items to 3D print or machine on the CNC Wood router.
- **CNC Wood/Plastic Router Classes (Intro):** Learn the basic principles of CNC wood routing on the Shapeoko 2 router. This class will introduce you to the basic process steps so you can machine small items. This class is free to members and has a $20 fee for non-members.
- **CNC Wood/Plastic Router Classes (Adv):** Apply the principles of CNC wood routing on the Greenbull Router. This class introduces you to a powerful 3 Horsepower router spindle for cutting large and thick materials. The **(Intro)** class is a prerequisite to this class. You must be a member to take this class and it has a $30 fee.
- **Embedded Systems Group:** 3rd and 4th Tuesday of the month with lessons in soldering, basic circuitry and electronics projects.

Groups meeting at Bridgewire

- Big Brothers & Big Sisters (activity monthly)
- Reno Robots
- Your group can meet here also. The only requirements are that at least one member of the group must also be a Bridgewire member and that the group obey the rules of our Policy Manual. Schedule your event per the calendar instructions below.

FINAL NOTES

Clean up for the cleaning crew?

Bridgewire's industrial cleaning service has been doing a terrific job of keeping the shop tidy and dust free. We can all help them focus on the deep cleaning aspects of their job by keeping work areas organized and cleaning up after ourselves. Let's not forget that Bridgewire is a co-operative facility that relies on member participation to maintain the facilities while keeping an affordable fee structure. This service frees us to spend more time on infrastructure issues. There's plenty of need for repair and maintenance of the tools and equipment.

New Members Perry Healey, Robbie Ayres

BRIDGEWIRE CALENDAR

BELOW Click on “Calendar” to go to the Bridgewire calendar with interactive event details.

ALL MEMBERS, If you would like to add an event. Email us at info@bridgewire.org or click on the button below the calendar to schedule your event with details and contact info. The new event will be approved by an officer or director to make it show up. Your events can be any project you want to share or get help with. Add Event

Calendar