

A call for help

to: Gwen, John, Dan, Greg, Elecktra, Fire Mike, Mike, Cindy, (Mike Matera, Casey,) Mitchell. (Casey is not interested in doing lighting this year, and Mike M. is not going. Anyone know of someone who could/would like to do some lighting? How about others who may be interested in this project?)

Intro:

By now, you probably have heard about the tower I'd like to build this year. *This is likely to be my last project at Burning Man.* Gwen and I have talked about making this our last year on the playa (at least for a while) and ending on a high note, and I think this could be it. I am writing to you to see if you'd like to be part of the team.

Compared to Cruz the Wave, it will take far less prep time before the playa to ready the pieces, and less time on the playa to assemble.



The idea is to build a tower to hold up a mandala shaped target that will hold a wad of cannon fuse on burn DAY (Friday at 1:00pm-ish??) which will hopefully be ignited by 200-300 mirrors held by participants on the perimeter reflecting enough sunlight at the fuse to set it and the rest of the tower aflame.

The working title for the project has been the Sun Tower, but Dan's wife suggested Sun Fire, which I also like. We could also call it Sol Fire but it might be confused with the South Bay pre-compression event Soul Fire.

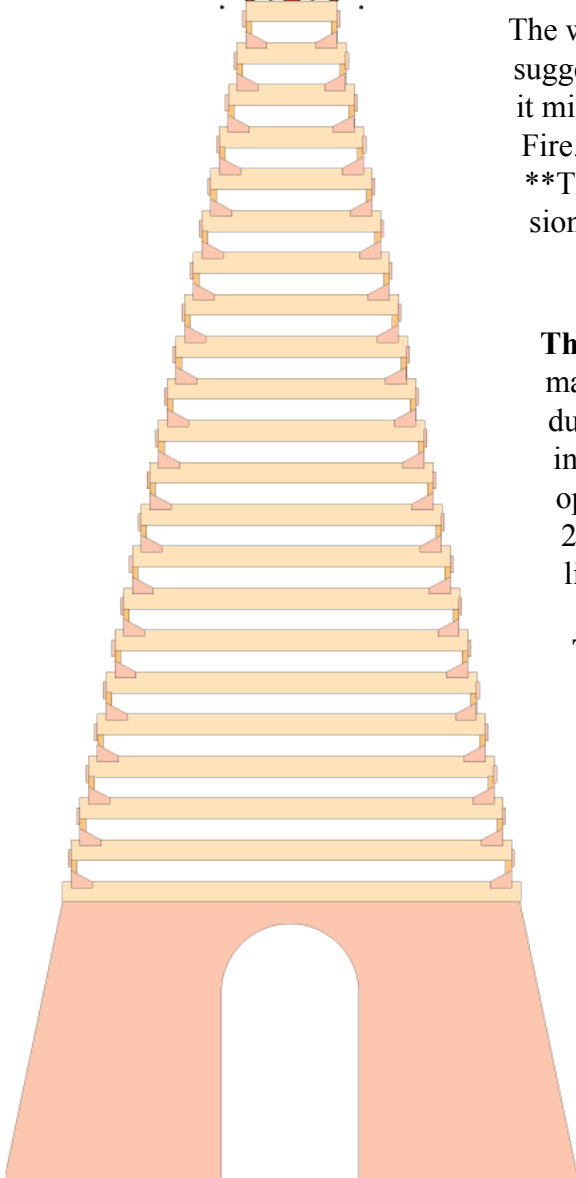
**This is something I'd like to discuss with the group to make a decision about.

Parts of the tower:

The base: The base of the tower will be built a bit different than the main part of the tower to allow people to get inside of the tower both during the event, and during preparation for the burn. I see making the 'front' and 'back' sides of the tower-the ones that have door openings in the-before we leave and connecting them with the precut 2x8s that will make up the sides of the base and continue the ladder like architecture from the ground to the main section of the tower.

The main tower: The main section of the tower is made of 2x8s (let's call them STRUTS) stacked on edge. Two gussets screwed into the end of each strut and the face of the strut below it holds each board in place. The gussets should be made of 1/2" or 5/8" thick plywood. We will cut 2 of the from 1 foot squares. I'd like to pre-drill the 5 screw holes ahead of time-makes it easier to assemble later (I'd rather use screws for this that a nail gun for several reasons. I think the screws will hold better and can be sized so they don't poke out through the back side of the struts. Also, I think we can come up with more screw drives than nail guns and hoses so we can have more people involved in building the tower on playa.)

The bottom of the main tower is 10' wide and the top is 2' wide. By buying a pile of 12' struts, the part that is cut off of the



lowest struts becomes the top struts, The second lowest becomes the second from the top strut and so on.

The mandala: I want to make something that is radially symmetric, and either look like the sun or maybe a large complicated flower, maybe 5-6' in diameter. I see it as having many layers of wood all glued and screwed together. I'd also like something colorful. At the center, I see having a small semi-parabolic mirror to help the focusing of the light from the mirrors below on the target.

**This is something I'd like to discuss with the group to make a decision about. I am looking for some input on the details of the mandala.



The kindling: I hope I learned a lot from last year's fire. I want to carry as much kindling to be deployed within the structure on burn day as possible. When we built the Pagoda in 2004 that was similar in construction, we added several cords of wood on burn day to insure that it burned well. I hope to collect (mostly from John's shop and construction jobs??) as much scrap wood as can be carried to the playa-maybe as much wood as the tower itself.



The lighting:

I was thinking that the lighting can be simple: a couple strands of LEDs on the inside of the tower running from top to bottom rotating or blinking in colorful patterns. I think I'd also like to light up the mandala, though it will complicate the building of it, and those LEDs would probably need to burn when the mandala does. I'd like to power the whole thing with 1-2 deep cycle auto batteries and avoid the hassles of a generator running all night. If our lighting folk are willing to work on the lighting, and want to go much more elaborate than this, I'd love it and think this could be amazing at night.

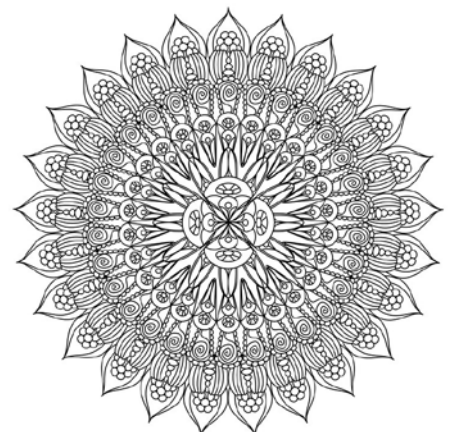


The mirrors: I've been thinking that 2 sheet of 1/8" thick mirrored Plexiglas cut into 6" squares will be enough. Each 4x8' sheet will yield 128 mirrors (256 total). If we go with 4" square mirrors, we can get 288 mirrors out of one 4'x8' sheet. Let's see how we do on fundraising.

New sheets of Plexiglas are expensive. Anyone know of a source for second hand mirrored plastics? (I don't really want to take 200+ glass mirrors to the desert.)

The signage: I want to make signs to place in/around the tower explaining the historical background and what we are planning in hopes of attracting people to bring more mirrors from camp. One or several Vinyl signs would do the trick.

The DG platform: We get this from the BM org. It is likely to be the most expensive part of the project if they feel that the tower may fall like a tree. In that case, we'll have to have a DG base that can catch the majority of the burning wood regardless of which direction it falls. It is my plan to start fires from top to bottom so the whole tower is aflame early on, not the base first slowly climbing to the top. I don't expect we can plan it to drop in it's footprint, but I'm hoping to get it to fall as close to the base as possible. (Any constructive thoughts about this are welcome.)



The rewards: Fundraising online will take some good rewards. I'm thinking some pendants that look like the tower and/or the mandala and/or the sun might be a good start. Some of the 6" mirrors used to light the tower sent after the event might also be good rewards. I'm open to other thoughts here.

The transportation: John, if it is available, I'd like to use the car hauler. I'll need to get a hitch put on my truck if it is. That trailer will be more than enough to carry the wood and supplies needed to build the tower, and perhaps an equal volume of kindling to make the fire a toasty one.

Costs:

First guesses. I'm trying to pad the numbers a bit to get a realistic feel for what this might cost.

The tower: \$1000-1200

The mandala: \$200-300

The mirrors: \$250-600

The signage: \$100

The DG: \$1000-2000

The lighting: \$200-400

The Fuel/Fusing: \$100

The rewards: \$200-400

The total: \$3050-5500

Fundraising: Fundraising will be needed to come up with the cash to build this project. I'd like to get one or more pages up on Kickstarter/Indiegogo, goFundMe or wherever the hottest place is now. I'd like to ask everyone on the team to contribute \$100-200 to start us off: I feel it is important to have some skin in the game if we are asking others to contribute. If we DO happen to raise enough to cover all the expenses, I think we can pay back those that contribute. I am also hoping that we can get the BM Org to give us a couple tickets we can sell and/or maybe contribute all or part of the cost of the DG.

Events:

Early entry & Building: I don't know if I can convince the ARTery to allow us early entry on Tuesday, but even if we get there by Thursday, I think we'll be OK to build the tower in 2-3 days. I just want to be able to get the team members in early. The structure is a ladder that is climbable all the way to the top, and only takes 2 people screwing the gussets to hold the struts together, and 2-4 people to bring the struts and gussets from the ground up to those screwing it together. The longest/heaviest boards are at the bottom where they can be handed up or carried a short distance. As the tower grows, the size of the boards that need to be schlepped up the ladder continues to decrease.

The Mandala should be completed before we arrive (or more likely in a small number of pieces that need final assembly) and we'll get a crane to lift it into place.

Burnday plans: On burnday (Friday around 1pm), we'll get a crane to lift the mandala down to the ground to fit the fuse into the mandala focal point. The target fuse will connect to several long coils of fuse that will be rolled up temporarily. The mandala will be reinstalled on top of the tower. (It may be possible to do this without a crane depending on the design of the mandala if we can come up with an easy to load system.) The main LED lighting within the tower will be removed. At 2-3 locations up the tower, shelves will be added and kindling wood will be stacked onto the shelves. Much more kindling wood will be stacked into the base of the tower. The rolls of fuse will be unrolled from the mandala running down to the shelves of kindling all the way down to the piles of wood at the base. Just before the fire, zip-lock bags with gasoline will be added at each pile of kindling under the fuse to get the fire started well.

By this point, the perimeter will have been established, and we can start handing out mirrors to participants. We will then use a megaphone (as much as I hate them generally!!) to signal the crowd to aim at the target, and

hopefully start the fuse ablazin'.

Cleanup: Since the fire is (hopefully) starting around 1:00pm, it will probably be down to ashes shortly before sunset, making cleanup a bit more challenging than a nighttime burn. I think the best thing to do will be to keep feeding the larger bit of wood into the fire (as always) and do a quick cleanup of the majority of the ash as soon as possible before it gets to dark and returning in the early morning to do a more thorough clean up of the metal and ash that remains. This will mean surrounding the site with lights Friday night.

No sun plans: If the sun is out and we fail to light the target using the mirrors, I suggest that we set the tower on fire from the base and let the fuses burn up to the higher shelves.

If the sun isn't out and blazing as we approach the burn time Friday, we'll consult the weather forecasters at the airport and wait if it looks like there will be better conditions within a couple hours. If there is no sun on Friday, we have several possible choices 1) we burn it Friday regardless of sun starting the fire from the base and let the fuses carry the fire to the upper shelves, 2) we try again with mirrors on Saturday or 3) we install 4 wooden wheels when we build it and after the Man burns down, we roll the tower over to the man platform to burn it up (the tower should weigh a little less than 2 tons).

(I'm leaning toward #1: burning it regardless of sun or a successful ignition on Friday before 2pm.)

****This is another thing I'd like to discuss with the group to make a decision about.**

Next Steps: I want to have a meeting with everyone who is or might be interested in being on the build team. To discuss the project, toss around the ideas I've laid out above and polish up the parts that I've left a little hazy. I want to do this asap because filling out the ARtery art application needs to happen soon so we can see if/what objections they might have and try to get them to help us out with tickets and either give us a cost of the DG, or try to get them to give it without cost (unlikely, but I want to see if there is any chance.)

Please reply to this Call for Help if you are interested in building this project.

Historical Background:

Archimedes Heat Ray?

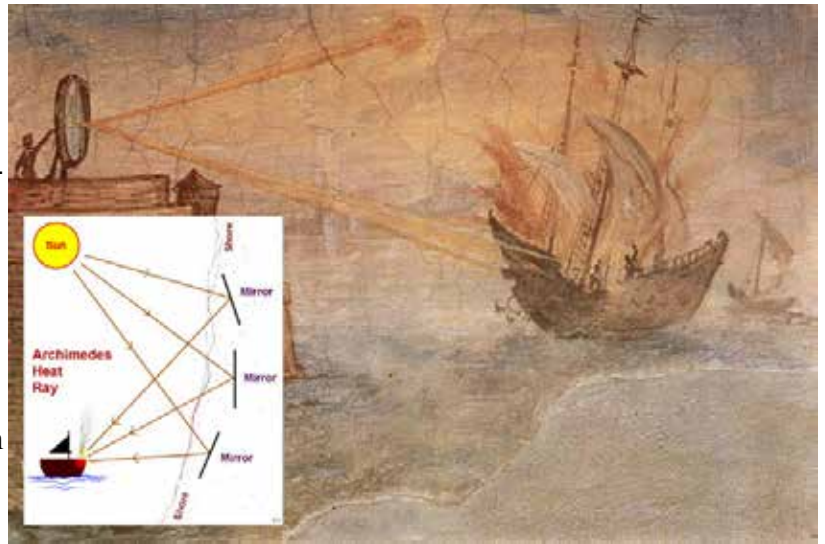
The 2nd century AD author Lucian wrote that during the Siege of Syracuse (c. 214-212 BC), Archimedes destroyed enemy ships with fire. Centuries later, Anthemius of Tralles mentions burning-glasses as Archimedes' weapon. The device, sometimes called the "Archimedes heat ray", was used to focus sunlight onto approaching ships, causing them to catch fire.

A test of the Archimedes heat ray was carried out in 1973 by the Greek scientist Ioannis Sakkas. 70 mirrors were used, each with a copper coating and a size of around five by three feet. The mirrors were pointed at a plywood mock-up of a Roman warship at a distance of around 160 feet. When the mirrors were focused accurately, the ship burst into flames within a few seconds. The plywood ship had a coating of tar paint, which may have aided combustion. A coating of tar would have been commonplace on ships in the classical era.



In October 2005 a group of students from the Massachusetts Institute of Technology carried out an experiment

with 127 one-foot square mirrors, focused on a mock-up wooden ship at a range of around 100 feet. Flames broke out on a patch of the ship, but only after the sky had been cloudless and the ship had remained stationary for around ten minutes. It was concluded that the device was a feasible weapon under these conditions. The MIT group repeated the experiment for the television show MythBusters, using a wooden fishing boat in San Francisco as the target. Again some charring occurred, along with a small amount of flame. In order to catch fire, wood needs to reach its auto ignition temperature, which is around 300 °C (570 °F).



When MythBusters broadcast the result of the San Francisco experiment in January 2006, the claim was placed in the category of "busted" (or failed) because of the length of time and the ideal weather conditions required for combustion to occur. It was also pointed out that since Syracuse faces the sea towards the east, the Roman fleet would have had to attack during the morning for optimal gathering of light by the mirrors. MythBusters also pointed out that conventional weaponry, such as flaming arrows or bolts from a catapult, would have been a far easier way of setting a ship on fire at short distances.

In December 2010, MythBusters again looked at the heat ray story. Several experiments were carried out, including a large scale test with 500 schoolchildren aiming mirrors at a mock-up of a Roman sailing ship 400 feet away. In all of the experiments, the sail failed to reach the 210 °C (410 °F) required to catch fire, and the verdict was again "busted". The show concluded that a more likely effect of the mirrors would have been blinding, dazzling, or distracting the crew of the ship.

(The above is edited from wikipedia.org.)

My opinion: It is unlikely that Archimedes set the ships on fire with mirrors. Probably the best argument is that if it worked so well, why didn't anyone else ever use this to fight off an enemy? Still, the story is such a good one that it has persisted for centuries.