



## Mastercam Innovator of the Future

2012 Competition

Bridge and Saddle for Acoustic Guitar

Celebrity Judge: Taylor Guitars

### The Competition

The 2012 Mastercam Innovator of the Future competition challenge is to create a bridge and saddle for a full size six string acoustic guitar. The entries will be judged by world-renowned Taylor Guitars.

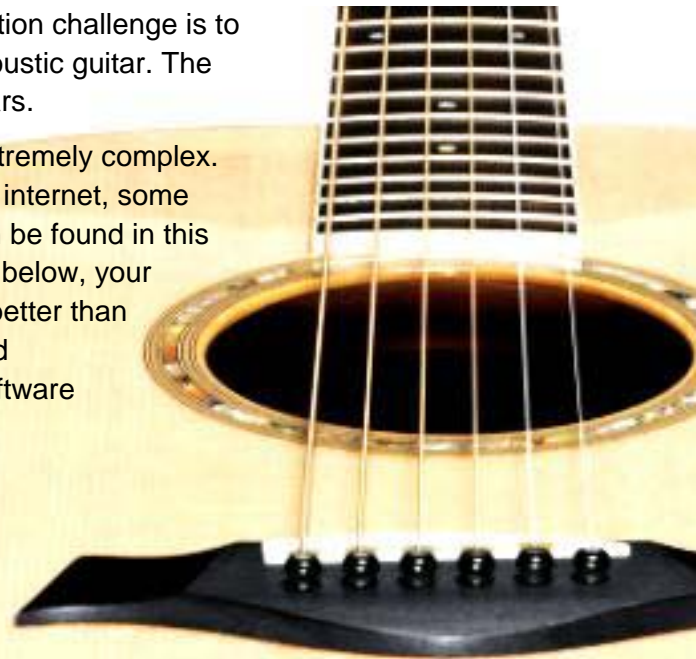
Overall, a bridge and saddle can be very simple or extremely complex. Although much more information can be found on the internet, some information about what they are and what they do can be found in this document. In addition to the utilitarian functions listed below, your entry must also have an appealing design, making it better than any of the other competition entries. Your entry should showcase quality workmanship and arrive at CNC Software ready to install on an acoustic guitar.

#### Purpose of Bridge:

- Anchor the ends of the strings
- Hold saddle
- Transfer vibration of the strings from the saddle to top of the guitar
- Possibly separate strings and hold strings in place

#### Purpose of Saddle:

- Hold strings the appropriate distance away from the finger board
- Transfer vibration from the strings to the bridge
- Possibly separate strings and hold strings in place



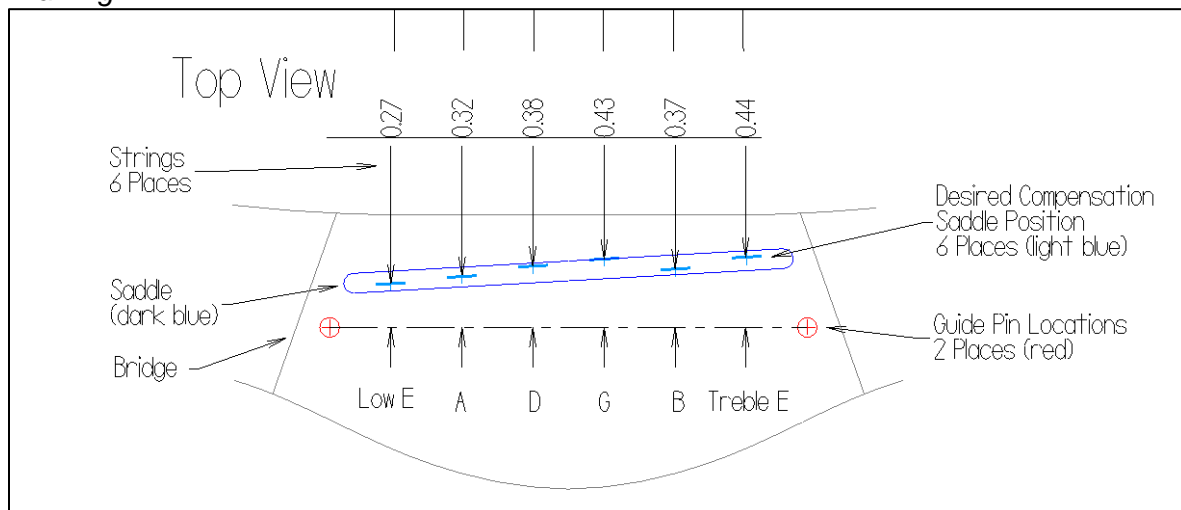
## Specifications

These specifications allow for a large range of design freedom. The examples illustrated are included to add clarity. Individual designs can have any appearance, style, and form as long as the playability of the guitar is not compromised and the specifications and assembly requirements are met. For the purposes of this contest, the bridge will have a contoured underside to facilitate being glued to the top of the guitar. Tolerance on all given dimensions will be  $\pm 0.005$ ".

### Guide Pins:

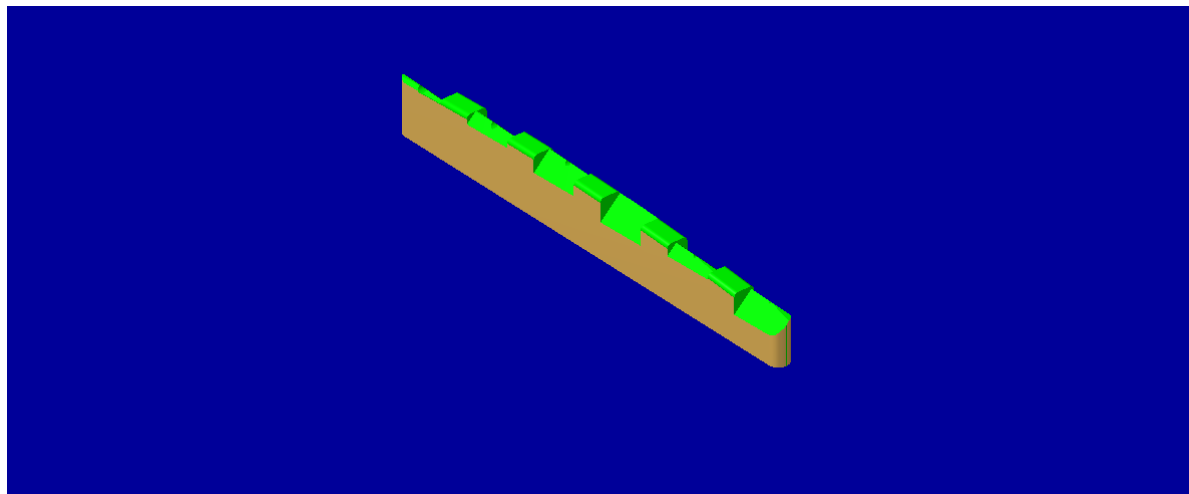
Two 0.125" holes must be machined into the underside of the bridge to accept 1/8" dowels used to position the bridge in the proper location on the guitar top. Guide pins are located 1.500" on either side of center line of guitar strings. Minimum depth of hole for the guide pins is 0.100". Critical feature dimensions of the bridge and saddle will be based on distances from the guide pins. See Drawing A.

Drawing A



## Saddle:

Below is a simplistic example of a saddle. In this example, it would slide inside a slot in the bridge and be held in place by the strings. Each design can vary as long as the string locations are accurate. Using a single piece saddle, the illustration below shows the desired compensation for each string to be the appropriate length.



Material: Historically made of bone, hard plastic, brass or other suitable dense, durable material can be substituted.

Saddle rough dimensions:

Saddle thickness: Minimum 0.125"

String spacing: Separated evenly with overall distance being 2.1875" from center of string to center of string

String distance from guitar top: (See Drawing B)

Low E: 0.445"

Treble E: 0.385"

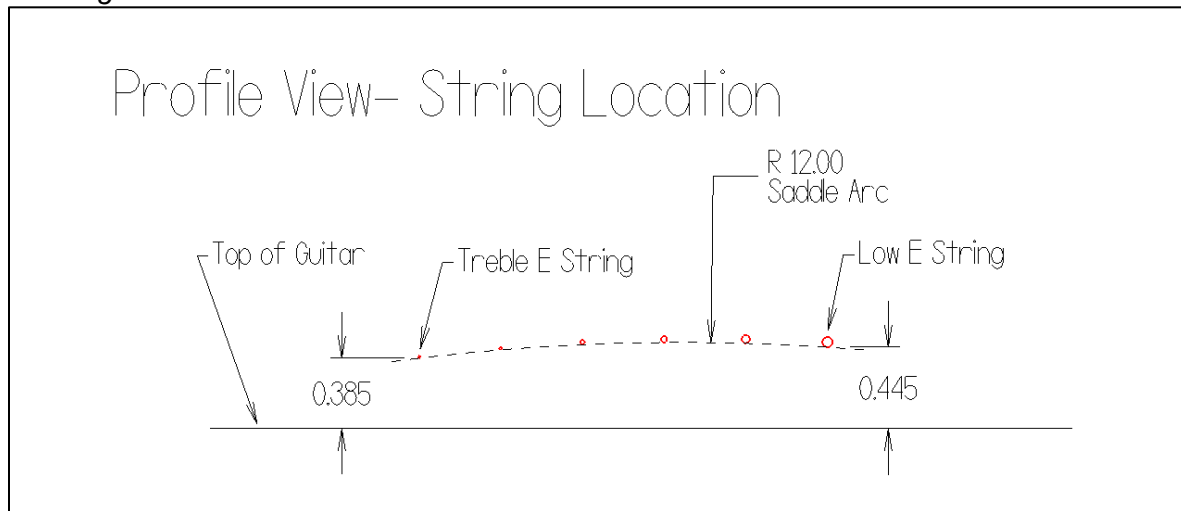
Saddle arc must have a 12" radius. (See drawing B)

The saddle must be removable and cannot be permanently attached to the bridge to allow for vertical adjustment.

String lengths from nut (basically the saddle type object supporting the strings near the head of the guitar) to saddle vary depending on the string. Desired compensation for each individual string must be used to obtain the appropriate string length. Use the chart below to locate the appropriate saddle position for each string. (Also see Drawing A, above.)

<u>String</u>	<u>Distance from guide pins</u>
Low E:	0.27"
A:	0.32"
D:	0.38"
G:	0.43"
B:	0.37"
Treble E:	0.44"

## Drawing B



### Bridge:

**Material:** It is expected that the bridge be made from ebony, rosewood or other attractive hardwood. Other materials can be used if the superior attributes of the alternate material can be identified and justified

Bridge can be made as a single piece or multiple piece assembly.

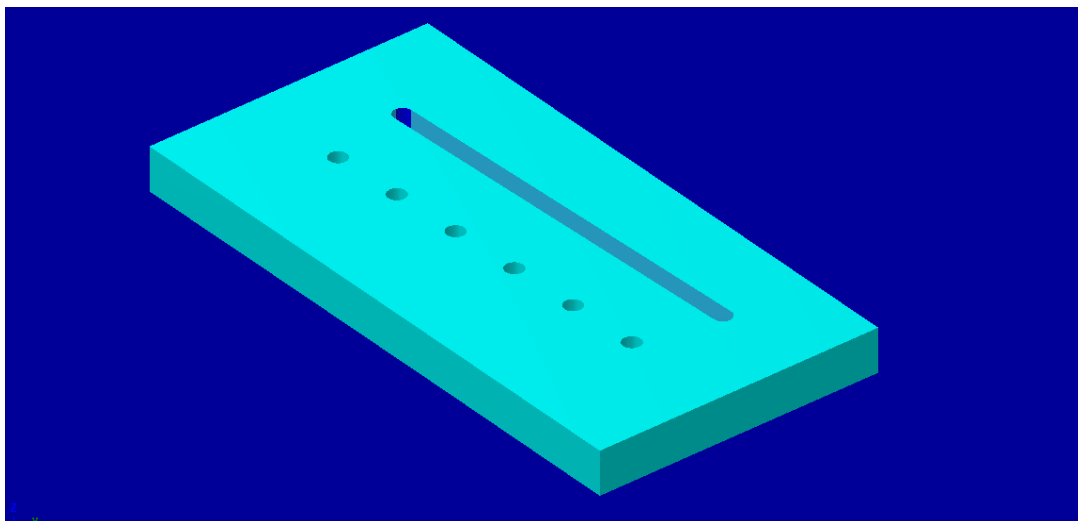
Bridge can have a symmetrical or an asymmetrical shape.

Bridge can be of any design but must meet design specifications for size and guitar playability.

Bridge needs a positive method of anchoring the strings using the string ball (see dimensions under "Strings" below).

**Platform for Saddle:** If attempting a more traditional look, the saddle slot in the bridge to hold the saddle must be at least 2/3 the total width of the saddle piece to hold it firmly in place.

Below is a simplistic example of a bridge including a place to anchor the strings and a slot to insert the saddle.



**Bridge rough dimensions:**

**Width and Length:** No minimum or maximum dimensions. The bridge must accommodate the guide pins, strings and saddle.

**Surface Area:** Must be sufficient for glue to adhere and without causing string tension to distort the top of the guitar.

**Thickness:** The thickness of the bridge is a function of the string height and saddle. Minimally the Bridge must be thick enough to hold 2/3 of the saddle and allow the saddle to hold the strings in the appropriate location. (For more information on string location, see Drawing B, above.) At a maximum, the bridge cannot be so thick as to allow the vibrating strings to touch the bridge.

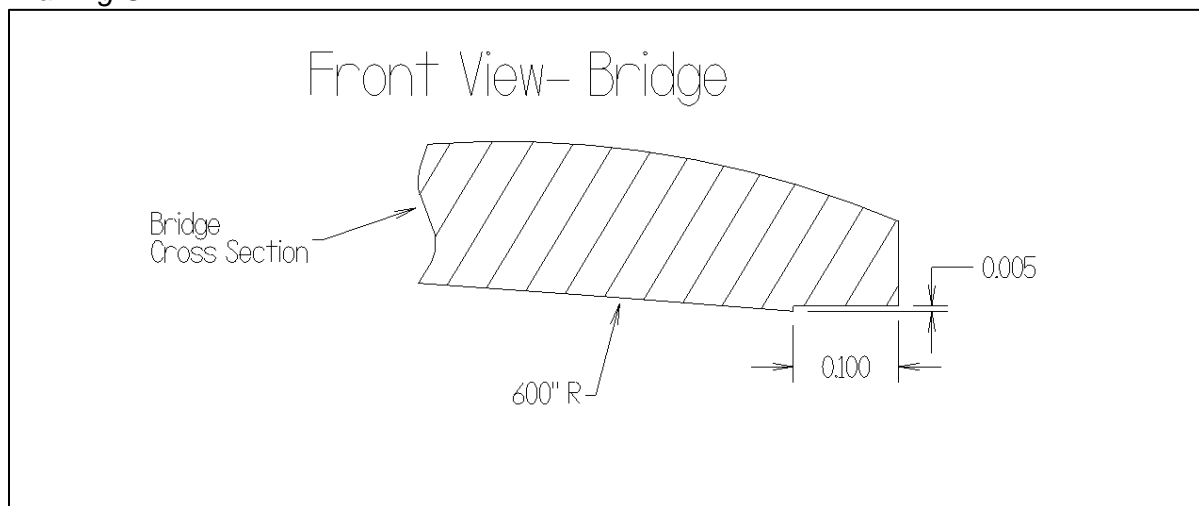
**Note:** Emphasis should be given to the underside of the bridge:

*Underside of bridge must fit the 50' (600") spherical radius of the guitar top.*

Underside of bridge must be unfinished to accept glue to adhere it to the guitar top.

A clearance relief cut 0.100" wide by 0.005" deep must be machined into the underside of the bridge around the entire outside edge. (See Drawing C)

*Drawing C*



## Strings:

String data is included to ensure the saddle and bridge design accommodates all strings.

<u>String</u>	<u>Diameter</u>
Low E:	0.056"
A:	0.045"
D:	0.035"
G:	0.026"
B:	0.017"
Treble E:	0.013"

"Ball" of the string is a tubular cylinder 0.156" diameter, 0.116" tall with an internal diameter of 0.082"

*Image of String Ball*

