

Technology 7

Bridge Design Journal Entry #1 11-19-13

1. Today in Tech class we reviewed the Problem Solving Process (See attached sheet)
2. We reviewed the bridge terms. (See attached sheet)
3. As a class we read the and highlighted the Bridge problem statement and how it fit into the problem solving process.
4. We set goals and listed Rules
5. For homework we are to research truss designs and brainstorm by drawing at least five thumbnail drawing of different truss designs (See attached Sheet)
6. We went over the grade sheet for the bridge project "Design Journal Assessment." Each group member must have a grade sheet in the Design journal

Problem Solving Process:

Step 1: Identify and Define the Problem

We have to build a bridge that has the best efficiency factor. The bridge that can hold the most weight on the least amount of money.

$$\text{Efficiency Factor} = \frac{\text{Cost of Bridge}}{\text{amount of weight held}} \quad E = \frac{\$}{\text{lbs.}}$$

Step 2: Set Goals and List Rules

Set Goals: We talked about setting goals for the project. They should be realistic. Some example goals could be grade related, how we place in the competition, or just simply completing the project etc. **(I want to place in the top 3 groups in the class and get at least a B on the project.)**

List Rules: Here are some of the rules for the project

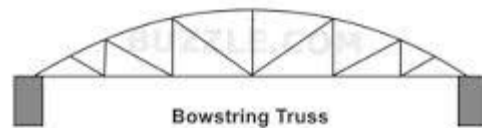
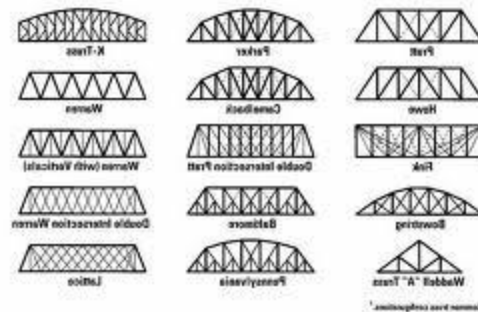
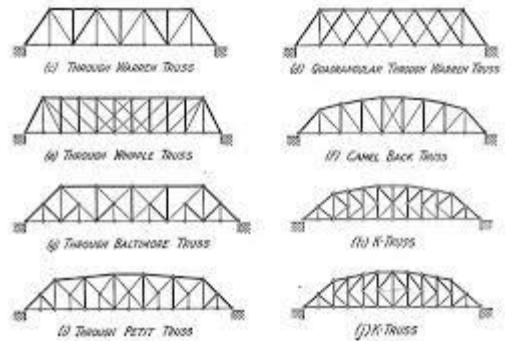
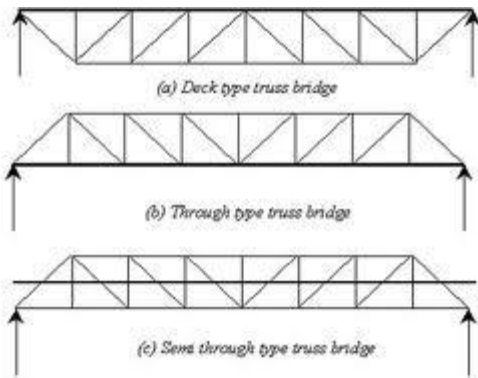
1. Bridge must be at least 10" long. 12" is recommended
2. Bridge must be between 3-4" Tall
3. Bridge must be between 3-4" Wide
4. You can not layer or "laminated more than 3 pieces"
5. The bridge must be a truss design
6. Bottom member of bridge can not to laminated
7. 2-3 people per group
8. All members pay total cost of bridge
9. At least 5 thumbnail drawings
10. Excessive glue use is fined increases cost and E factor goes up

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Step 3 of Problem Solving Process: *Brainstorm and Research*

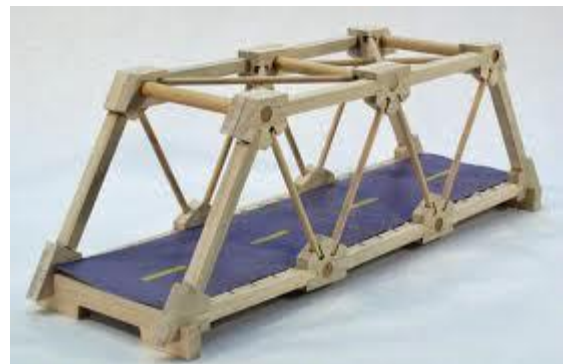
Research: Some Truss designs from Google Images



Bowstring Truss

Top chord is a true arc.
Members are often like a pratt

Small text at the bottom of the grid of truss diagrams, likely a source or license notice.



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Step 3 of Problem Solving Process: *Brainstorm and Research*

Research: Bridges in Rochester NY

“The Old”

"Broad Street and Court Street Bridges and N.Y. State Barge Canal Terminal, Rochester, N.Y."
(Postcard ; no publisher information) -- approximately 1925



The bridge is 364 metres (1,194 ft) in length, with the longest span, the arch-supported roadway crossing the Genesee, encompassing 140.9 metres (462.3 ft). In terms of width, the structure is 39.8 metres (130.6 ft) wide.^[2] The roadway on its surface is eight lanes wide, with four reserved for each direction of I-490. On a daily basis, the structure carries an estimated 71,640 vehicles over NY 383 and the Genesee.¹

“The New”

The **Frederick Douglass–Susan B. Anthony Memorial Bridge** (called the **Freddie-Sue Bridge** by some Rochester residents^[4] and known as the **Troup–Howell Bridge** until July 13, 2007) is a triple steel [arch bridge](#) carrying [Interstate 490](#) (I-490) over the [Genesee River](#) and [New York State Route 383](#) (NY 383, named Exchange Boulevard) in downtown [Rochester, New York](#). The bridge, officially completed on June 18, 2007, replaced a 50-year old multi-[girder bridge](#) situated in the same location.

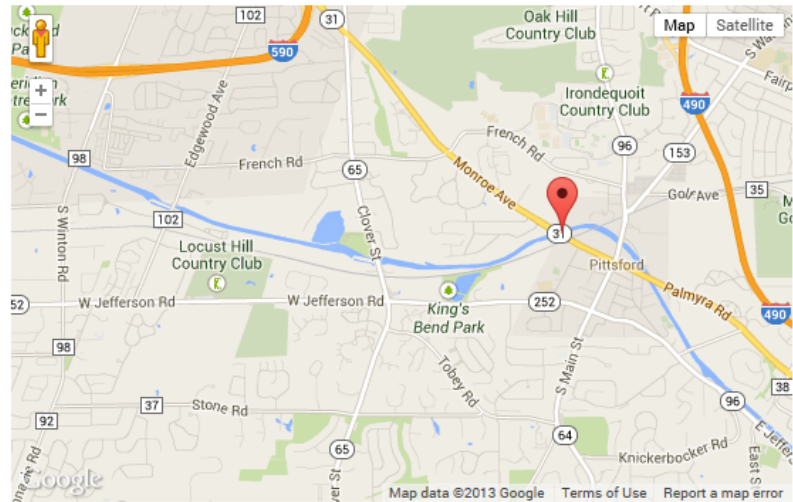
Info from wikipedia

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Map



Overview Through truss bridge over Erie Canal on NY 31 in Pittsford Location [Brighton](#), [Monroe County](#), [New York](#) Status Open to traffic History Built 1941; rehabilitated 1973 Design Polygonal Warren through truss with alternating verticals Dimensions Length of largest span: 239.8 ft.

Total length: 382.9 ft.

Deck width: 42.0 ft.

Vertical clearance above deck: 14.7 ft.

Approximate latitude, longitude +43.09333, -77.52167 (decimal degrees)

43°05'36" N, 77°31'18" W (degrees°minutes'seconds")

Approximate UTM coordinates 18/294769/4774265 (zone/easting/northing)

USGS topographic map Pittsford

Inventory numbers NY 4443290 (New York State bridge identification number)

BH 26272 (Bridgehunter.com ID) Inspection (as of 11/2010) Deck condition rating: Fair (5 out of 9)

Superstructure condition rating: Fair (5 out of 9)

Substructure condition rating: Good (7 out of 9)

Appraisal: Functionally obsolete

Sufficiency rating: 57.6 (out of 100)

Average daily traffic (as of 2011) 19,100

<http://bridgehunter.com/ny/monroe/4443290/>

Thumbnail Designs: Quick Sketches of ideas see attached

We are to draw at least 5 thumbnail design of different truss design we want to use for the project. *See attached sheet for thumbnails*

“Don’t be a minimalist” Draw as many thumbnails as I can so I have more to choose from .



KISS it !



Sometimes designers and Engineers overdesign or make a problem to complicated they say to themselves KISS it.

Acronym for **K**ep **I**t **S**imple **S**tupid



Driving Park Bridge over the Genesee River in Rochester NY facing north, the former Eastman Kodak "Hawkeye" Plant is at the right

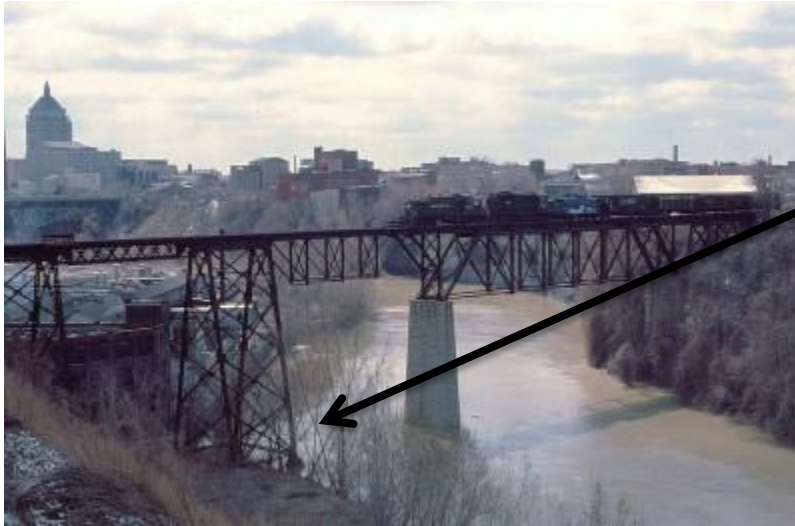
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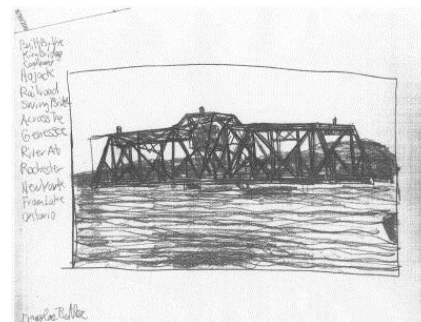
Step 3 of Problem Solving Process: *Brainstorm and Research*

More Research: Bridges in Rochester NY

Towers and bridge truss designs lots of Triangles



Ap77 ex RWO Bridge
Bridge built by R W &
O to their depot. Last
used to carry coal to
power station.
Photo taken by Ed
Storey about 1980



Hojack Swing Bridge at
mouth of Genesee River

Overview: Abandoned through truss bridge over
Genesee River

Location: [Rochester](#), [Monroe County](#), [New York](#)

Status: Removed but not replaced

History: Built 1905

Builder: - [King Bridge Co.](#) of Cleveland, Ohio:

Design: Through truss

Info from :

<http://bridgehunter.com/ny/monroe/hojack-swing/>