CAMAS HIGH SCHOOL
Technology Education Program

"Bridge Building Challenge"

PROBLEM: The department of Transportation is requesting bids for a low cost, efficient truss bridge to span a slow moving river that separates two communities. Your Technology Challenge is to design and construct a scaled model of a bridge that will effectively span the river. The strongest bridge at the lowest construction cost is your ultimate goal.

CRITERIA:

1. You must work in teams of two.

2. Construction material for the bridge will limited to 20 linear feet of 1/8" x 1/8" bass wood and glue provided.

3. THE SIMUALATED MATERIAL COSTS are as follows:

$25,000 per steel beam (every 12" of bass wood)

$500 per truss joint (glue joints)

4. KEEP A RECORD OF YOUR CONSTRUCTION COSTS TO STAY UNDER BUDGET, ($850,000).

5. SCALE 10mm = 15'

6. The bridge must SPAN the river a distance of 225' (150mm).

7. Bridge Minimum WIDTH (Roadway) = 75' (50mm) but not greater than 120' (80mm).

8. Bridge LENGTH = 450' (300mm) or less.

DESIGN AND CONSTRUCTION TIPS

- Triangle trussing is sturdier than rectangles.
- The stronger bridge will distribute the weight evenly across the structure.
- The strongest bridge may not be the most efficient.
- Draw one or more sketches of possible truss designs.
  Imagine a load placed anywhere on the truss. How will the truss members transport the load across the bridge evenly?
- **NOTE: LAMINATING TWO BASS WOOD STICKS FACE TO FACE IS NOT ALLOWED**

CRITERIA FOR JUDGING

A. Method to be used with a bridge testing machine.
    1. Bridge efficiency shall be determined by the following formula:

    Load (in lbs.) x 4.45 = Failure Weight

            Failure Weight

EFFICIENCY (E) =))

        Weight of Structure (Grams)

    2. The structure will be weighed and the weight entered into the formula as "Weight of Structure (grams)."
    3. An increasing load will be applied to the bridge via the bridge tester until the bridge fails. The reading on the tester gauge will be entered in the formula as "Load."
    4. The bridge with the highest efficiency number is the winning bridge.

B. Method to be used when testing with load.
    Bridge efficiency shall be determined according to the following formula:
1. Failure Weight (in pounds)
2. EFFICIENCY (E) =)))))))))))))))))))))))))))))))))))))))
3. Weight of Structure (in grams)

All efficiency ratings shall be calculated to three (3) decimal places. The team with

the highest efficiency rating will be the winner. In the event of a tie, the efficiency

rating will be calculated to the next decimal point until a winner is decided.

2. An increasing load will be applied to the bridge via the test hook (Diagram C) until

the bridge fails. The load will be weighed and the weight entered in the formula as
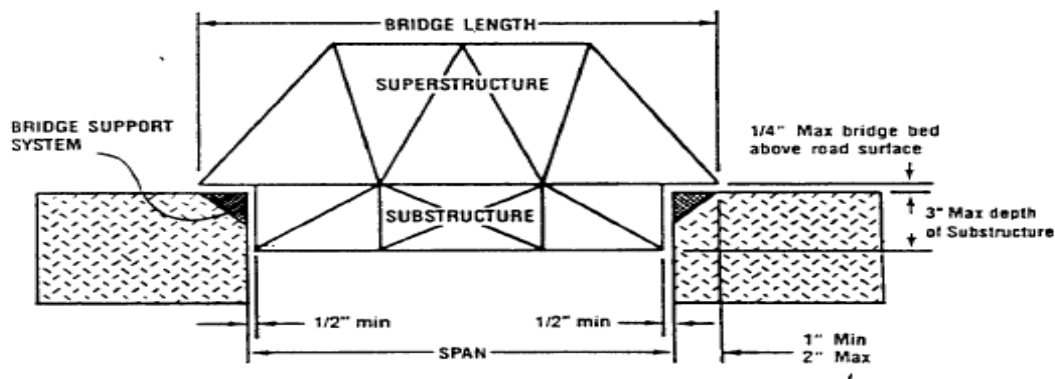
the "Failure Weight.

DIAGRAM A