

LONG STRING INSTRUMENT TECHNICAL REQUIREMENTS

- **Minimum length space required is 16 meters** (53 ft). Maximum functional length about 30 meters (100 ft.). Longer string length allows for a lower frequency range. **Resonant space is required; doesn't work outdoors.**
- Four methods of attachment have been designed (please see photo examples on my website under technical info tab):
 1. bolted directly into walls (easiest, fastest, cheapest)
 2. secured with nylon tie-down belts or cable around columns
 3. bolted into floors
 4. constructed as a self-supporting structureThese methods can be also used in combination, depending on the architectural situation.
- Each string is tensioned only to about 18 kilo (40 lbs.). The total tension load is about 725 kilo (1600 lbs.), not of much architectural significance. Fine string gague (.35-.23mm or .014-.009 inch) would break under more tension. If a string does break, the wire simply falls to the floor and has never caused an injury.
- One or two technicians help with the construction of supporting framework and set up.
- Please arrange for extended access to space. Ellen usually spends a couple of long days fine-tuning and rehearsing.
- Good work light is to be provided. Ideally, theatrical lighting is employed. Lighting instruments should be installed before the strings are put up. Smooth coverage and levels should be set so that performer is able to see the strings over the entire length of the installation.
- A pair of small studio monitors are required for the performance (even in a resonant space) placed on floor under the strings and using two condenser mics, on stands with small mixer. If space is less resonant, a high quality sound system is required.
- If double-sided box bow instrument is installed, please provide 30 5 oz. (160 gram) rocks.
- Installation is transported in **one standard size luggage weighing within 70 lbs. or 30 kilos**. If overweight charges are incurred, venue will be responsible for reimbursement.

IDEAL RESIDENCY SEQUENCE

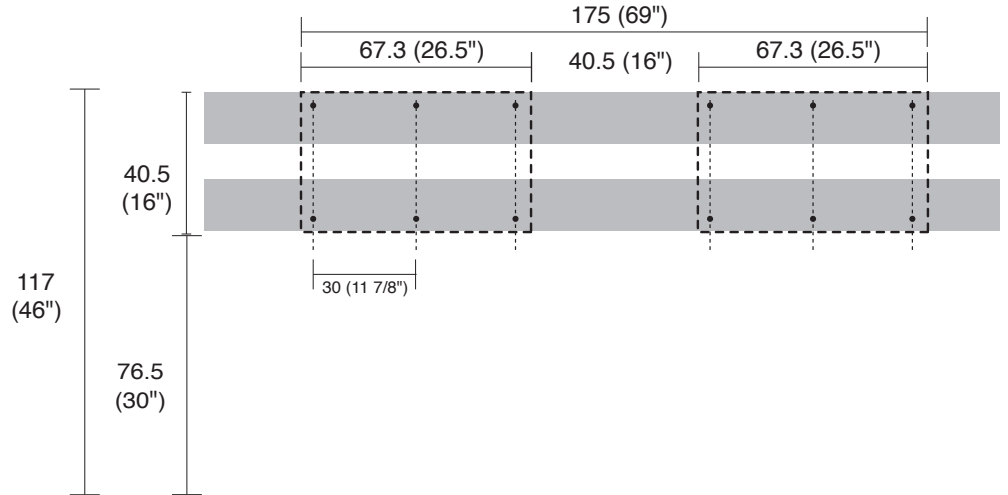
- **Before Artist's Arrival** Hardware materials purchased and framing constructed. Use heavy duty lumber (used is ok) and heavy duty hardware.
- **Day 1** Move-in of support structure and attachment into walls or floors while lighting instruments are installed and roughly focused. Resonators installed, string spool unrolled, tuning blocks attached to framing and strings tensioned and tuned. This process takes about 8 hours. Ellen is available to give a media presentation on her work in the evening.
- **Day 2** Rehearsals, sound check and lighting focused.
- **Day 3** Performance can be scheduled. Longer residency is preferred in order to give time for adjustments in the performance to the acoustics of the individual space.
- **Strike Within one hour, all touring components can be packed into luggage.**

LONG STRING INSTRUMENT INSTALLATION

wall-mounted

Resonator side

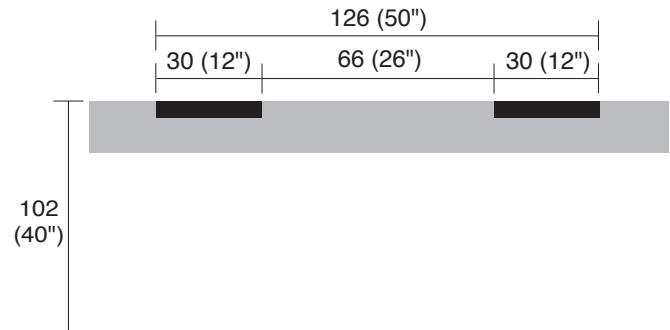
Dotted lines indicate footprint and position of resonators and mounting screw holes. Attach resonators with 12) ¼" x 2" (6 mm x 5 cm) lag screws. Grey bars indicate 5 x 15 (2 x 6) lumber, about 8 ft. or 2 m long.



Tuning block side

Black area indicates footprint and position of tuning blocks. Attach tuning blocks with 10) 3" (8cm) drywall screws. Note: center tuning blocks to the resonators.

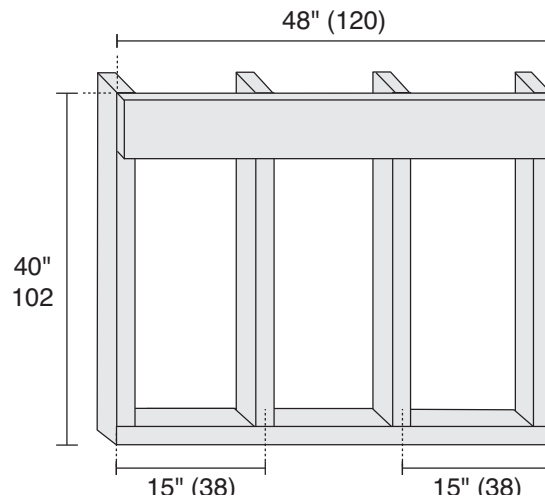
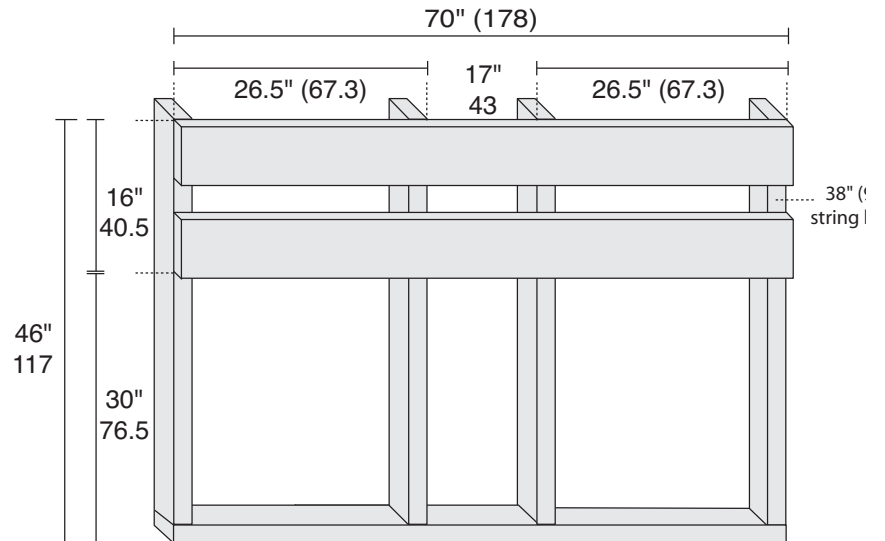
- Use at least 5 x 15 (2 x 6) lumber
- Leave designated areas clear of screws or counter-sink
- Securely attach these elements; total load is about 725 kilo (1600 lbs.)



LONG STRING INSTRUMENT INSTALLATION

secured with cable or nylon tie-down belts

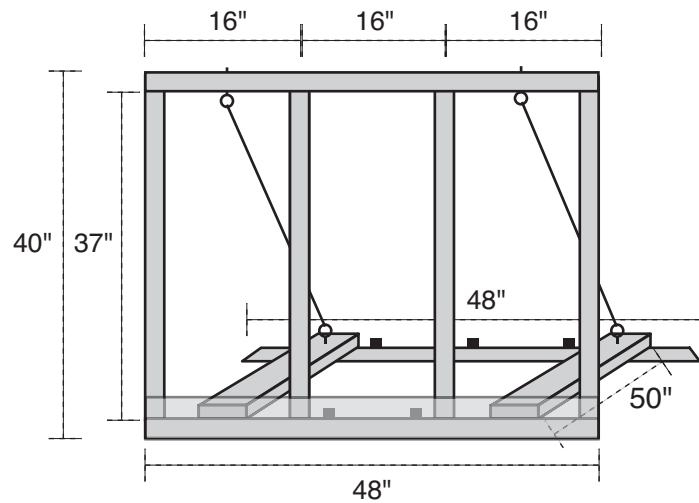
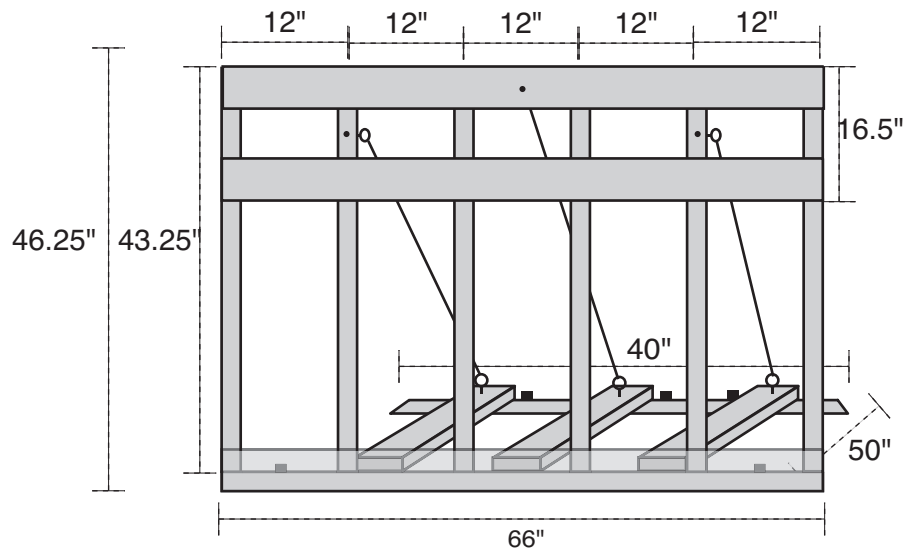
- Framing needs to be solidly over-built to maintain stable tuning. 725 kilo (1600 lbs.) overall force.
- Thick lumber, 2" x 6" or 5 x 15 cm minimum
- Heavy-duty long screws or lag bolts (3–4", 10–12 cm)
- Heavy duty tie-down belts or cable is used to wrap around secure architectural elements



LONG STRING INSTRUMENT INSTALLATION

framing anchored into floor

- Framing needs to be solidly over-built to maintain stable tuning.
725 kilo (1600 lbs.) overall force.
- Thick lumber, 2" x 6" or
5 x 15 cm minimum
- Heavy-duty long screws or lag bolts
(3–4", 10–12 cm)
- Add facing at floor level to
strengthen the joint.
- In concrete use ½" wedge anchors
Five anchors per side.
- Two diagonal cables (¼" or 5 cm)
tensioned turnbuckles are installed
on each stand.



LONG STRING INSTRUMENT INSTALLATION

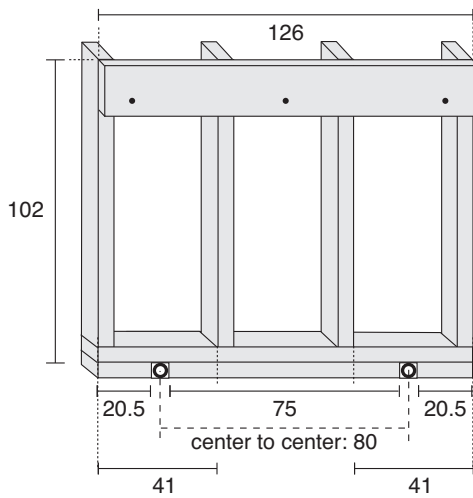
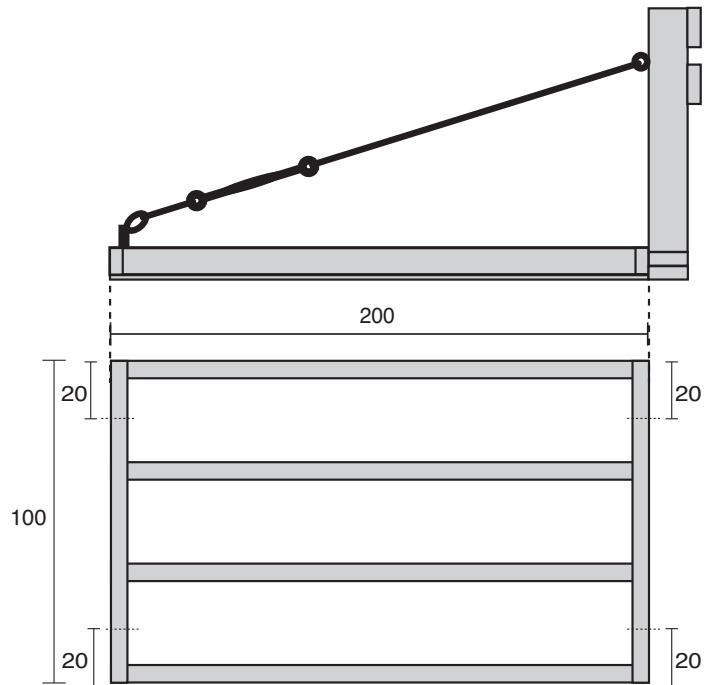
free-standing construction

Profile of assembled stand

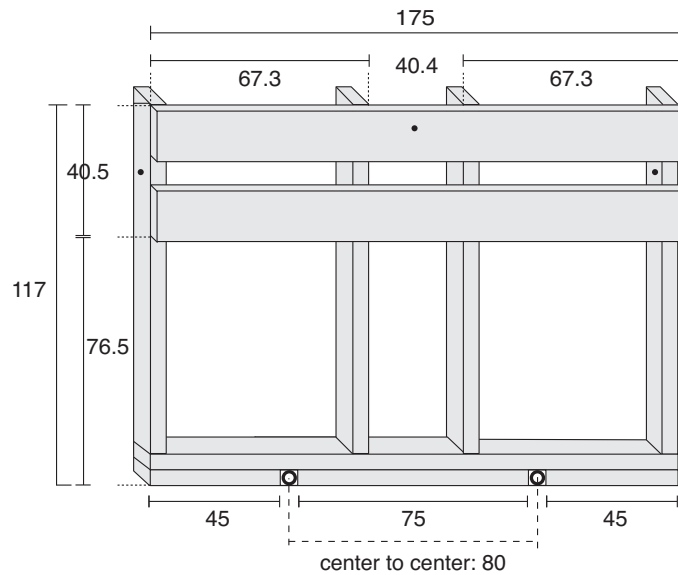
- Framing needs to be solidly overbuilt to maintain stable tuning, 725 kilo (1600 lbs.) overall force.
- Thick lumber, 2" x 6" or 5 x 15 cm minimum
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Counter weight platform

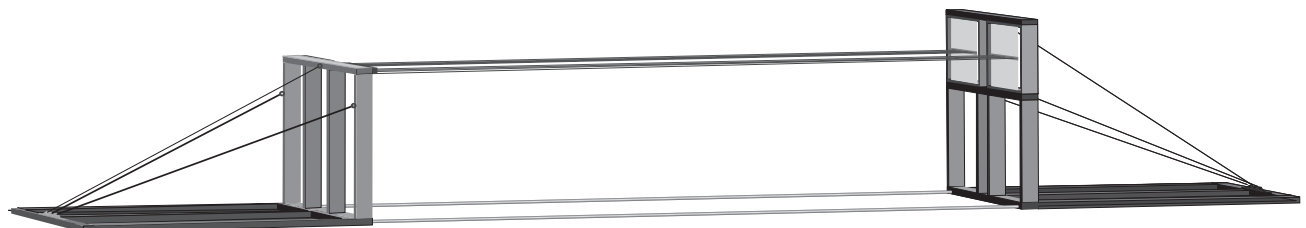
(make 2) Cover framing with at least 1.5 cm (½") plywood. Rough quality is ok. **Steel pipe** running the entire length of the installation is compressed against platform frame, hole is drilled for cable to pass through and anchor onto back frame surface with eye bolt. A good source for pipe is rented scaffolding or rigging. PVC tubing can be used as sleeves. Weights are placed on top. Water-filled oil drums or sand bags work well. The amount of weight required is about 225 kilo (500 lbs.) on each platform.



TUNING BLOCK STAND



RESONATOR STAND



ASSEMBLED FREE-STANDING SUPPORT STRUCTURE



Lighting design emphasizes floating string highlights

Long String Instrument Installation

lighting design

- Use ETC Source 4 Profile 575w 25-50 degrees or equivalent
- A 16 m long area can be covered by 5 instrument pairs at 6m height. Ends lit only by spill.
- Cut light sharp using knives along imaginary lines representing edges of strings (dotted line), then add frost.
- Hotspots of profiles alternate with each other; adjust as smoothly as possible combining amber and blue to neutral mix.
- Gel colors: Lee 134, and 201; covered by Roscoe frost 114.

