5. PREPARATION OF PLANS AND ELEVATIONS

The structure now has to be given time to dry out from the waterblasting. This provides a good opportunity to prepare plans and sections. There are several possible ways of doing this:

1. From archival sources

   It may be that the original engineering blueprints from the time of construction have been preserved in e.g., the New Zealand National Archives (especially for Ministry of Works {MoW} structures). These could be particularly useful for identifying later modifications of the original fabric. Scale is generally shown on old engineering drawings as a ratio (e.g., "one inch equals one foot" so you need to note any enlargement or reduction in the copying process.

2. By adapting standardised drawings

   Many old structures, for example New Zealand Rail (NZR) Howe truss bridges, were built from standardised components. In such cases drawings of another similar bridge, or a set of generic drawings for this type of bridge can be copied and relabelled to represent the bridge being dealt with.

3. By direct measurement

   The structure can be measured up by taking offsets from a horizontal string baseline with a tape measure, or a compass, clinometer and tape measure. A plane table with auto-reduction alidade will do the job more quickly.

4. By employing a professional

   A surveyor or architect can rapidly measure up the structure by theodolite and produce computer-generated drawings. By holding the laser reflector target (or idiot stick) the project manager gets to choose which dimensions and components are measured.

All drawings should show scale and orientation. Orientation can be indicated with a north point, but it is also helpful to indicate which direction is upstream or downstream, and so on.

5.1 NAMING AND NUMBERING

This section may sound pedantic but bitter personal experience shows these things to be important.

If the structure is a large one made up of repeated substructures (e.g., a multi-span bridge) these need to be numbered on the drawings in some standardised fashion. (The old NZR numbered its bridge spans in the same direction as they measured the mileage on that particular line. A better idea today is to number from true left to true right - see fig. 5. Span one (which commences at an abutment) is followed by pier one which is followed by span two and so on. In a large structure it may be worth physically numbering the substructures themselves

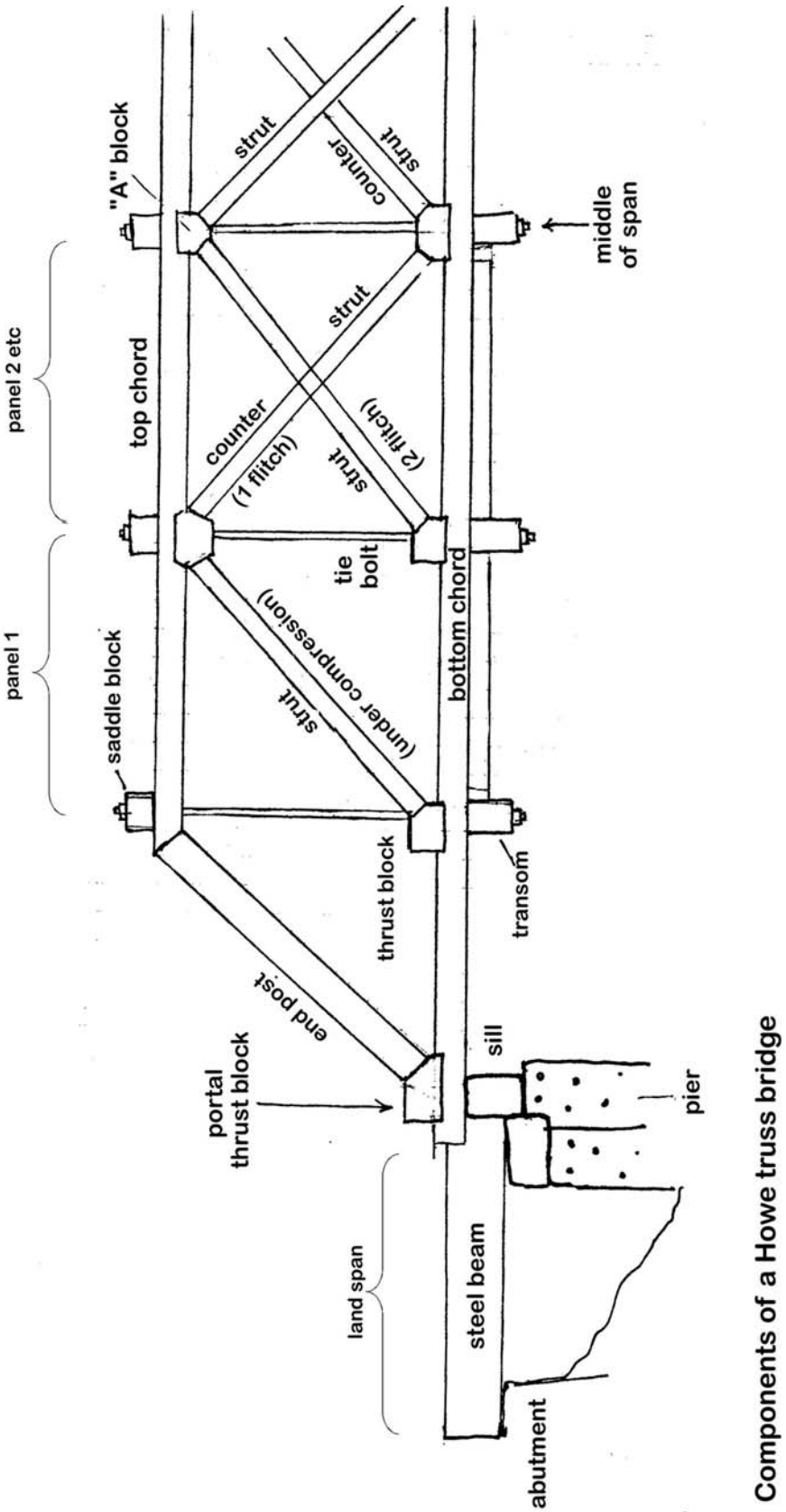


Fig. 1 Copmponents of Howe truss bridge

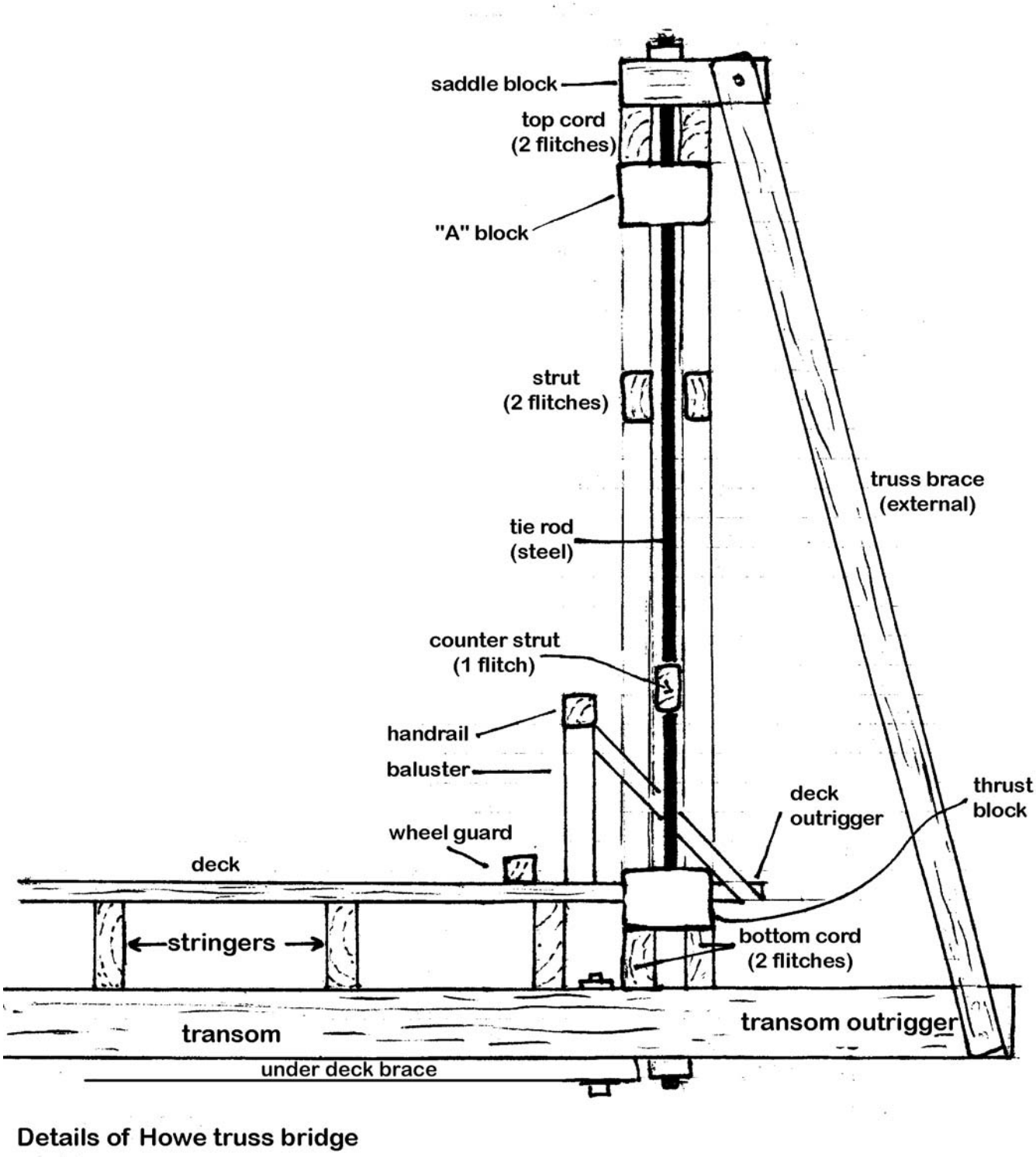
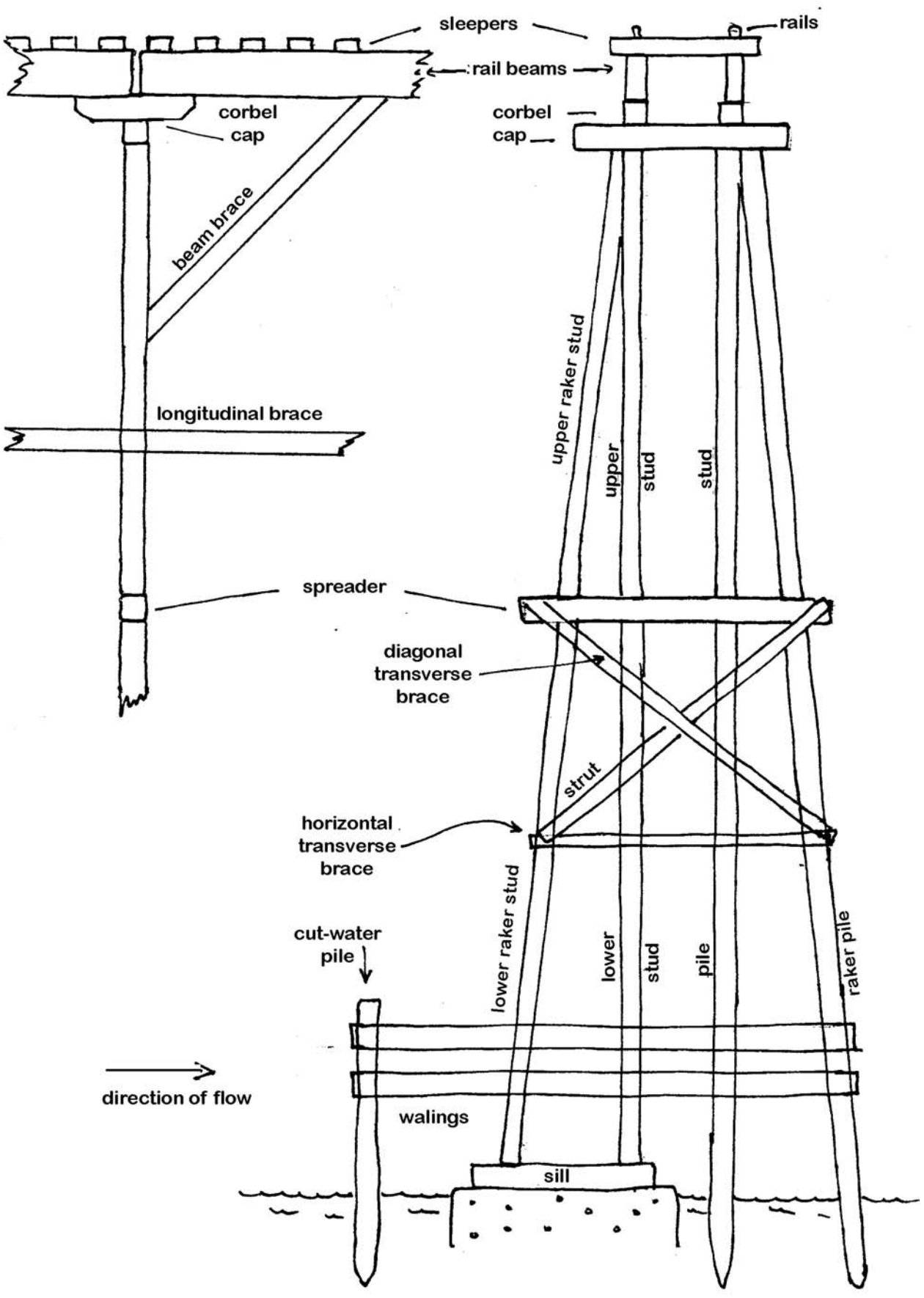


Fig. 2 Details of How truss bridge



Components of a beam-and-trestle bridge

Fig. 3 Components of a beam-and-trestle bridge

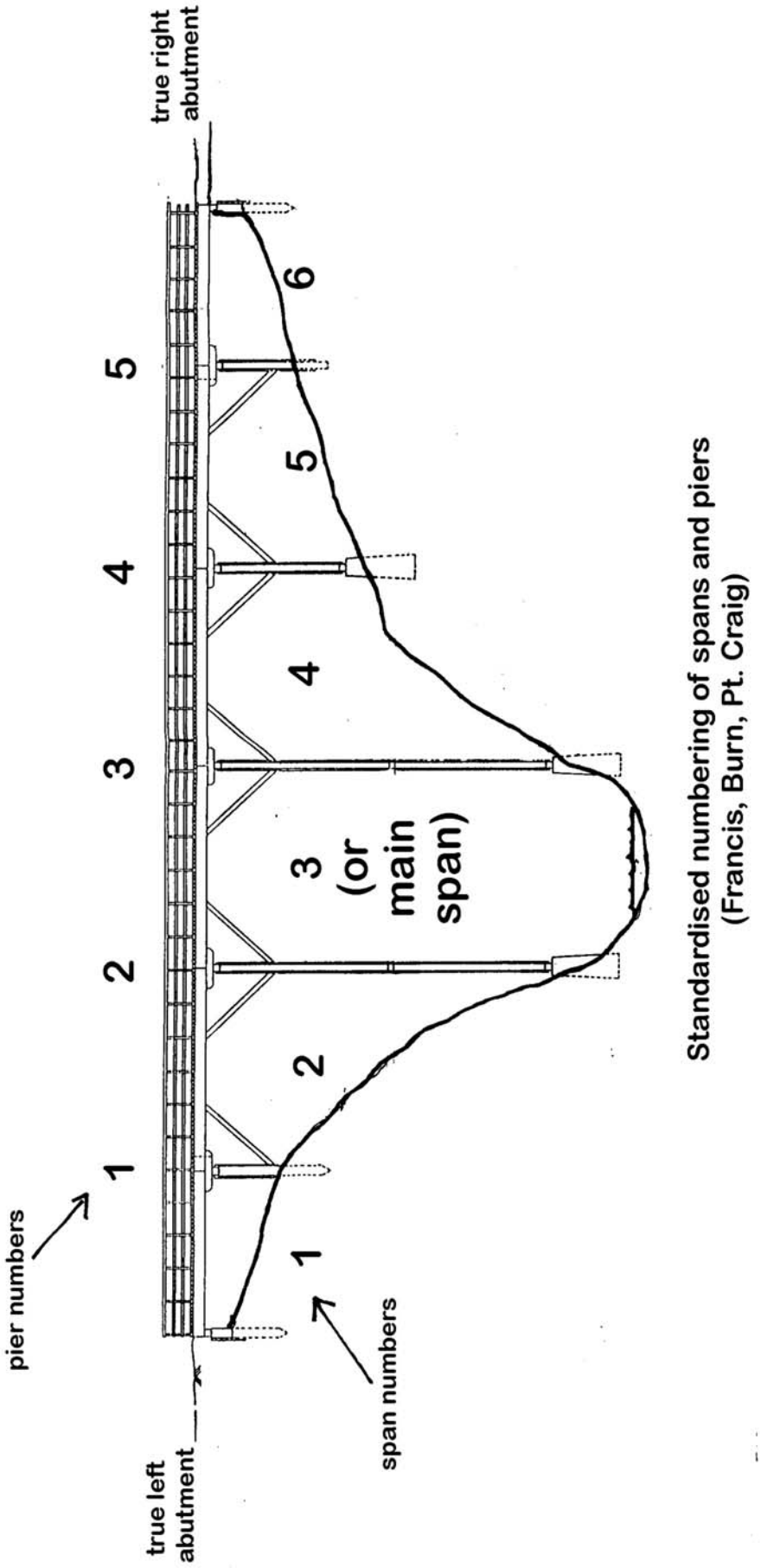


Fig. 4 Standardised numbering of spans and piers (Francis Burn, Pt. Craig)

as well, e.g., with plastic cattle ear tags, so there is never any confusion about which trusses, trestles etc. are being referred to or worked on.

Symmetrically paired components on a bridge also need unambiguous identification. Using “left” and “right” relative to the direction of numbering is a bit risky, since it invites confusion with “true left” and “true right” with respect to the river beneath. It is better to distinguish between “upstream” and “downstream” components.

Remember also that (for example) “sloping to the west” is ambiguous - does it slope up or slope down? When describing a horizontal surface you need to specify whether it is an upper surface or an under surface.

Since very few structures are laid out along the cardinal points of the compass it is best to confine the compass directions to descriptions of aspect - “the north side of the pile was less rotten than the south side.”

All this can get quite verbose, but there is no way of avoiding it - “A wood sample was taken one metre above riverbed level from the east face of the upstream true left pile of pier number two”. It’s turgid, yes, but it’s also precise and unambiguous.

Representative examples of the various components should be labelled on the drawings, to encourage everyone involved in a preservation project to use the same names for the same components, and so there is never any doubt as to what is meant when someone refers to, for example, a stringer, a corbel, a lintel, a raker or a thrust block. Some standardised terminology for common components is given in figures 1-4.