

HANDOUT FOR SKETCHING LECTURES AND COURSEWORK
Tom Swailes

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BASIC TECHNIQUE

Practice and experiment with the techniques described in the following pages by copying some of the examples from the sketch sheets. Do not use a ruler or set square, except for lettering exercises, and do not tape your paper 'permanently' to your desk - being able to rotate the sheet is sometimes useful. If you use thin paper (for example 80 g/m² copier or printer paper) use a second piece underneath for cushioning on top of the hard desk surface.

YOU MAY ALREADY BE ABLE TO WRITE NEATLY WITHOUT GUIDELINES.

WRITE A BLOCK OF TEXT, FIRST WITH NO GUIDELINES AND THEN WITH FAINT HORIZONTAL RULED PENCIL LINES TO DEFINE THE TOP AND BOTTOM OF EACH LETTER.

EXPERIMENT WITH A VARIETY OF CHARACTER HEIGHTS AND LINE SPACINGS UNTIL YOU FIND A STYLE THAT BEST SUITS YOU.

(Handout border in 0.5mm felt pen. Other lines and letters 0.5mm HB pencil)

LINES AND LETTERS

T. SWAILES

line quality

- Use a soft pencil (e.g. 0.5mm HB) to achieve a range of tone from light guidelines that will not show on a photocopy to very dark grey lines that will photocopy black. Provided that you are not too heavy handed, even the darkest lines can be erased without leaving a grey smudge on the paper.
- Lines drawn quickly and confidently look better. A slow, shaky line looks as though it does not know where it is going.
- Sharp lines tend to magnify errors. Fuzzy edged shapes usually 'appear' more as they should.

straights

- Lightly mark points at each end of the intended line. Move your pencil between the points a couple of times, with the pencil point just clear of the paper, to 'teach it the route'.
- Draw several guidelines between the points and then go over the 'best line' more firmly.

curves

- Use parts of complete ellipses or circles as guidelines for the curve (see SHAPES).
- For complex curves, use a join the dots technique.

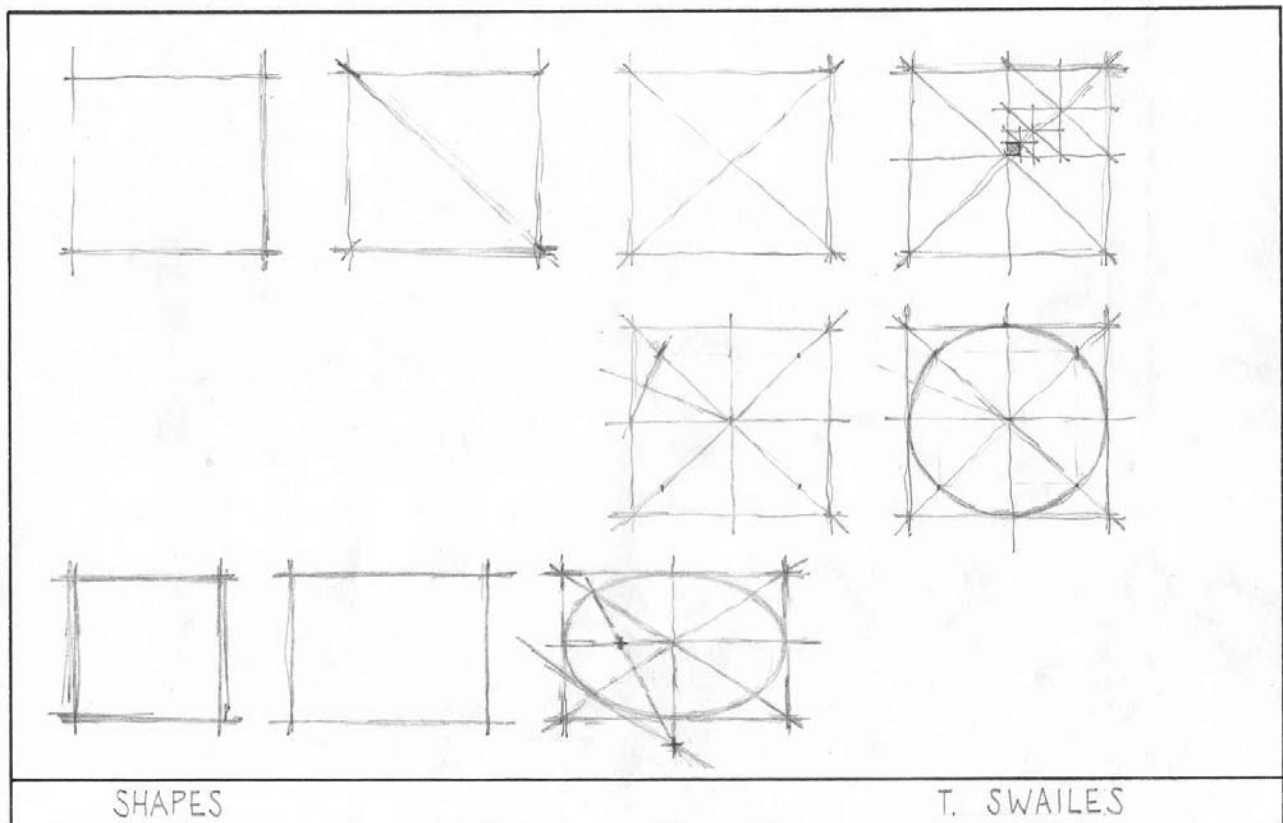
lettering

- Rule horizontal guidelines to define character height (i.e. top and bottom) and line spacing.
- Judge character length and spacing of characters and words by eye unless the lettering needs to be very large.

PRACTICE at every opportunity. Doodling is good practice for sketching.

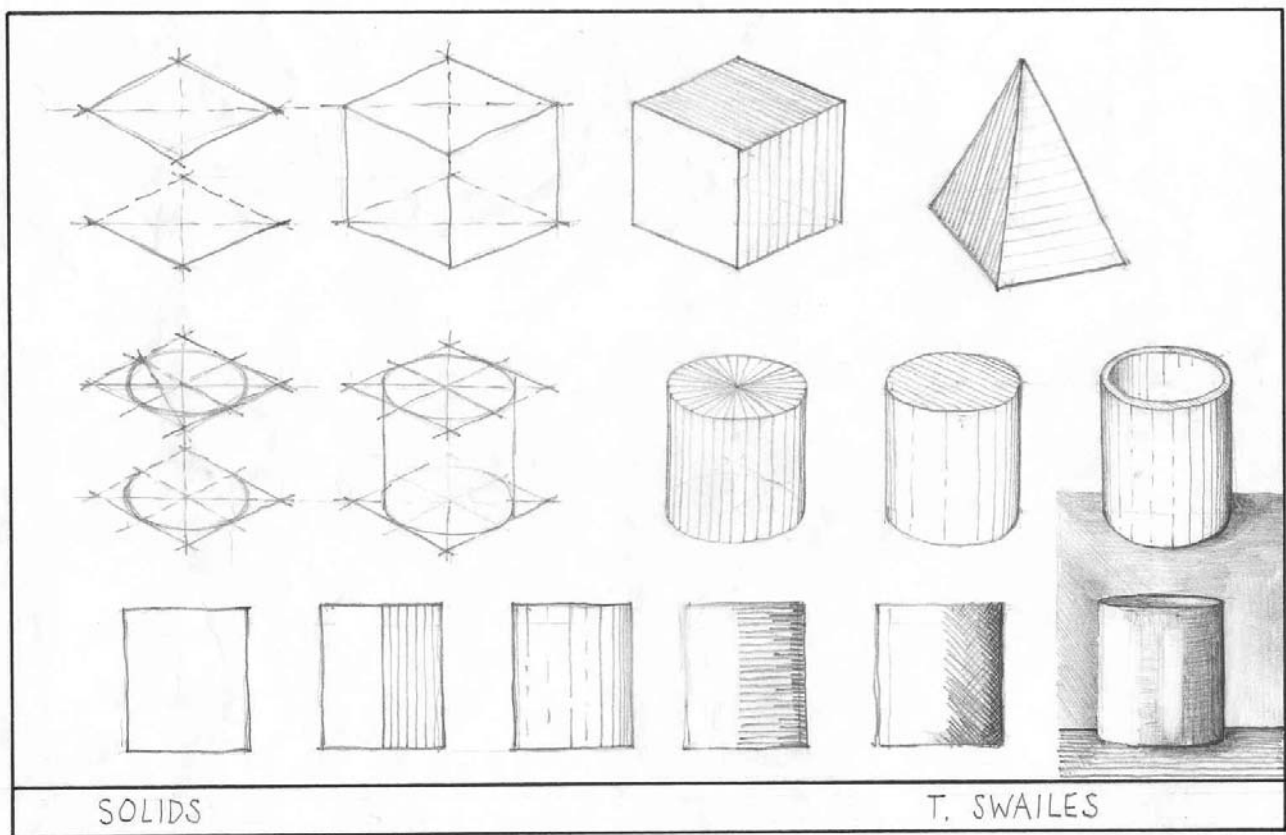
SHAPES

- Construct shapes using lines. Most of your lines will be guidelines so draw them to be either nearly invisible or easily removable.
- Use diagonals to find the centre of a square or rectangle, either for sub-division into smaller squares or rectangles or for the construction of circles or ellipses.
- The distance from the centre of a circle to its perimeter is constant (!). A circle will touch an enclosing square at the centre of each of its edges.
- As a square squashes to a rectangle, so a circle squashes to an ellipse. The ellipse is symmetrical about two axes and it still touches the squashed square at the centre of its edges.
- A very close approximation of an ellipse can be constructed with circular curves of two different radii.



SOLIDS

- Construct solids from lines and complete shapes, using light guidelines for both seen and unseen edges of the object.
- Go over or erase your light guidelines only when completely satisfied.
- A square approximates to a diamond when viewed at an angle. Draw a circular bar by constructing ellipses on the ends of an enclosing square prism.
- Apply line shading parallel or perpendicular to the slope of a plane to indicate form.
- A variety of techniques may be used to suggest a curved surface.
- Subtlety is lost in the photocopier or fax. so bear in mind how your sketch is to be reproduced.



AXONOMETRIC VIEWS

An axonometric view can be built up from a true plan and elevations as shown in the example below.

These views show 'true' dimensions of the object but require skill to read

Scaling by 'eye' for freehand sketching

1 Tilt the Plan

2 Draw the edges (seen and unseen) of the enclosing shape

3 Use diagonals to locate centres. Begin to 'sculpt' the block.

4 Begin to draw over your construction lines

5 Remove construction lines and tidy up

6 Use shading to emphasise form

Tips for Freehand Sketching

- Practice.
- Use rapidly dashed guide-lines.
- Break down (sculpt) or build up (assemble) complex forms.
- Use a soft pencil and good quality paper. Experiment to find a combination that suits you.

AXONOMETRIC PROJECTION / FREEHAND SKETCHING

T. SWAILES

COURSEWORK TS1 BUILDING SKETCH

An axonometric pencil sketch view of a North Campus building is required on an A4 sheet. The sketch should be freehand; in other words lines should be drawn without the aid of a ruler or straight edge. Border and title block lines should be ruled, in black ink, and you should use faint pencil ruled guidelines for lettering the title of the sketch and your name. The choice of building is yours, but my recommendation is that you choose from Renold Building, Pariser Building or Chandos Hall.

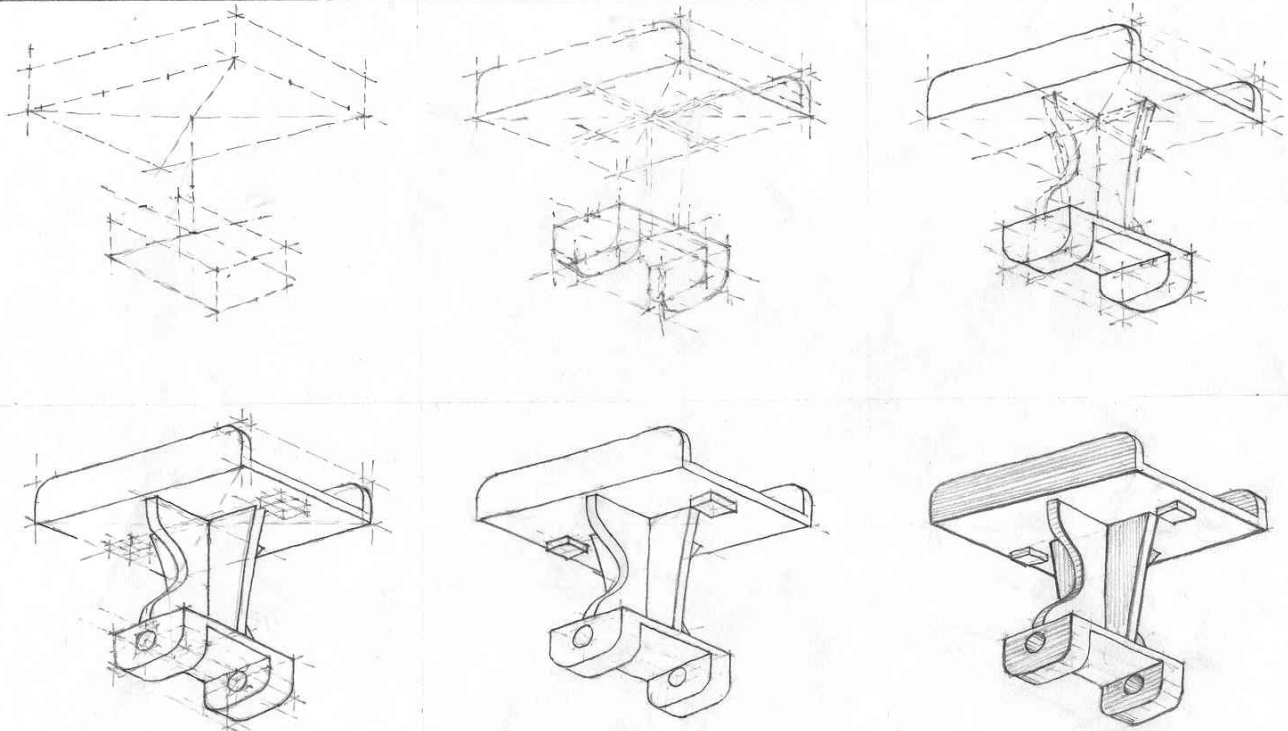
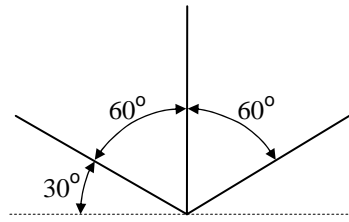
The 'building blocks' for the axonometric view are a 'true plan', rotated by 45° so that one corner of the building points down to the bottom of the page, and sketches (or photographs) of the two elevations that will be seen in the 3-dimensional view.

If your building has a square, flat roof, it will appear as a true square in 'axonometric projection'. Draw lines vertically up from the building 'footprint' to give height, but use a vertical scale of approximately two thirds the plan scale for a more realistic appearance. Take the building 'footprint' from an up-to-date campus map, enlarged to provide the basis for your sketch. Include some surrounding landscape detail so that the building appears to 'sit on the ground'.

Heights and elevation details may be estimated by looking at and comparing the buildings and adjacent structures. Accurate heights are not important. Photographs may be useful. The emphasis is on the presentation of a general impression of large building masses rather than precise details of all visible elevations. Shading or hatching, but not colour, may be used to emphasise shape and form.

ISOMETRIC VIEWS

An isometric view is based upon 3 axes along each of which lengths to the same scale.



SKETCH OF BRACKET BASED ON DIMENSIONED SITE SKETCH

T. SWAILES

COURSEWORK TS2

Object sketch

An isometric sketch is required. The example opposite shows how the finished article (the sixth image) can be built up in stages.

- Study the object and decide on the position and angle of view that will show the important features of the object most clearly.
- Look for symmetry.

Either

Assemble the object from simple solids, such as cubes or spheres, square, rectangular, triangular, circular or elliptical prisms, pyramids or cones.

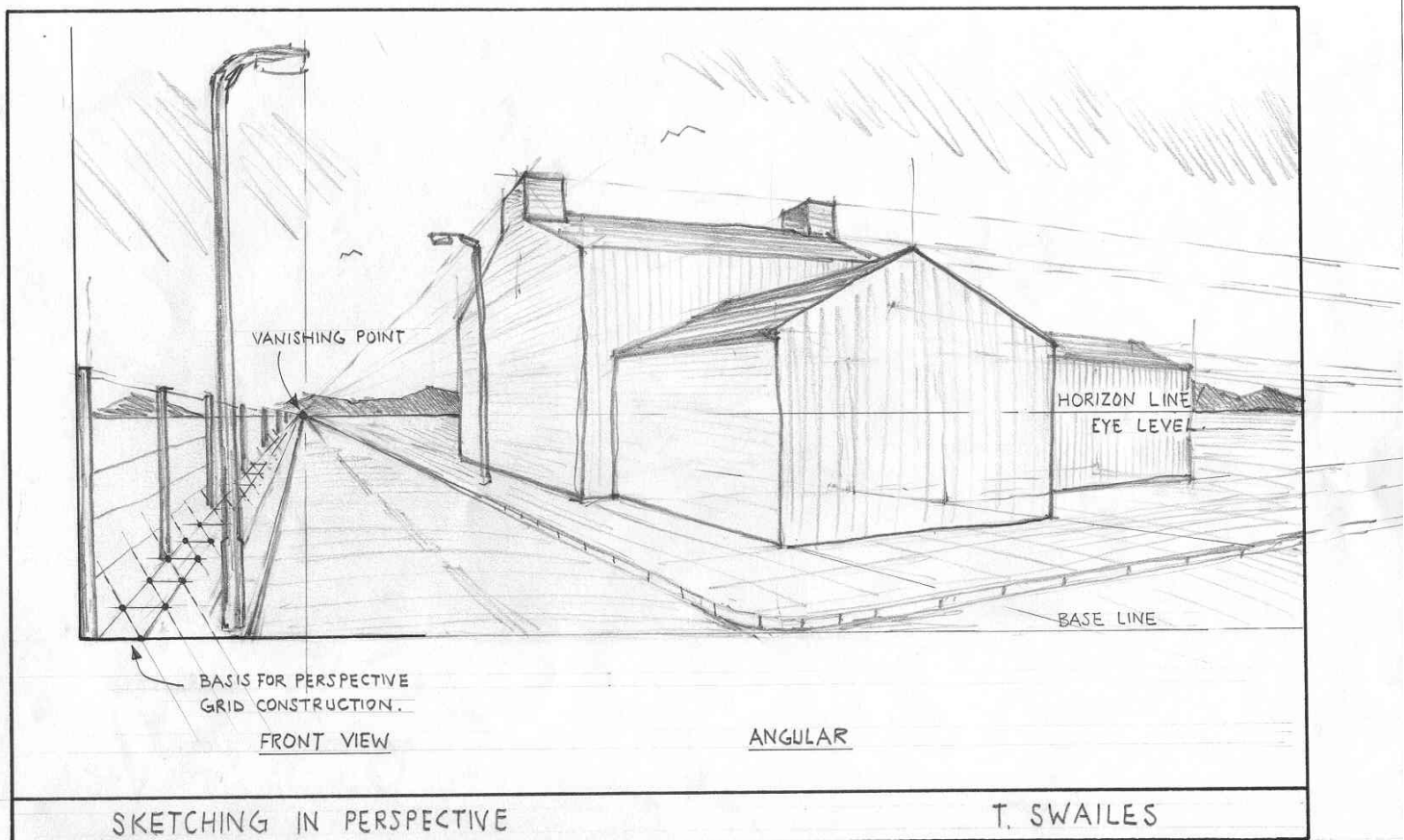
Or

Sculpt the object from simple solids.

- Look for common axes or alignments for the different parts of an object.
- Build up the object using faint guidelines for both seen and unseen edges.
- Be prepared to make adjustments by rubbing out and re-drawing faint guidelines, several times if necessary, to ensure that proportions are correct and that the sketch of the object will make best use of the available drawing area.
- Pause to make sure that you are satisfied with the result before committing dark pencil lines or ink to paper.
- Simple shading may be used to emphasise form but is often not necessary.
- For most objects, use either an approximately axonometric view based on a plan or an approximately isometric view for satisfactory results.

PERSPECTIVE

To the eye, more distant objects appear smaller and parallel lines that are not perpendicular to the line of sight appear to converge to a **vanishing point**. A perspective sketch may give a realistic picture of an object or scene, provided that the **viewpoint** is carefully chosen.



Basic principles

- What the eye sees without distortion is within a 60° **cone of vision**. Bear this in mind when deciding on the position of your viewpoint relative to what is to appear as the foreground of your sketch.
- In **front view perspective**, there is one vanishing point. In **angular perspective**, there may be two or more vanishing points.
- A vanishing point often needs to be beyond the border of the sketch for a view that does not appear distorted. Sketch in 'by eye' guidelines that converge to a

common vanishing point outside the drawing area - the exact location of remote vanishing points is not necessary.

- A ***perspective grid*** can be used as an aid to drawing objects at the correct relative distance and size to one another.
- Simple line shading can be used to indicate shape and form, with the amount of detail shown reducing with distance.

The application of some of these principles is shown in the example sketch.

COURSEWORK TS3 Building Interior Perspective sketch

Draw a freehand perspective sketch of an interior. Construction and finished lines should be drawn without the aid of a ruler. I suggest you choose one of the following internal spaces and use A3 paper, rather than A4.

Pariser Building: B floor Hydraulics Laboratory or D floor computer room

Renold Building: C floor main circulation space or northern entrance hall
(the stairs are good features to include)

If you find a different internal space more convenient or more interesting, that is fine. A large or long room is needed, with features in the foreground and middle distance to give the sketch real depth. An individual room in a hall of residence or 'bedsit' would not be suitable.

COURSEWORK TS4 Joint Detail sketch

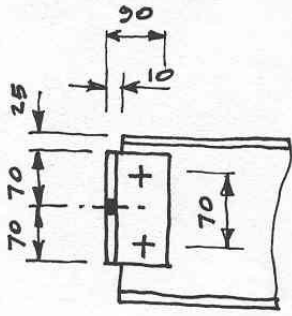
- An isometric sketch view is required to show the details of a structural steelwork connection in the Pariser Building, either the hydraulics laboratory or one of the heavy structures laboratories (see class list for allocation of details)

Choose a single viewpoint that best shows the different components of the connection and how they fit together.

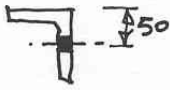
- For this exercise I expect you to make neat 'working notes and sketches' in the laboratory and from these prepare the finished sketch. This will test your skill in observation. These working notes and sketches should be submitted along with the finished sketch. Put your name on each sheet submitted.
- The isometric sketch view should be done freehand (without a ruler) in pencil.
- Once you have completed the sketch, it should be scanned, pasted into Microsoft Word and labelled. On the next page I have provided a 'before and after' example. You should add a border and title block in Word too. Either 'portrait' or 'landscape' format is acceptable.
- Take care with the arrangement (position and alignment) of labels. See the two sketch sheets on presentation on page 13 of this handout.
- Typical labels may include, for example:

- Universal Beam
- Universal Column
- Rolled Steel Channel
- Rolled Steel Angle
- Welded stiffener plate
- End plate
- Bolts (do not label individual bolts; positions may be shown schematically)
- Crane Rail
- Concrete Encasement
- Concrete Blockwork
- Roof Covering
- Floor
- Window

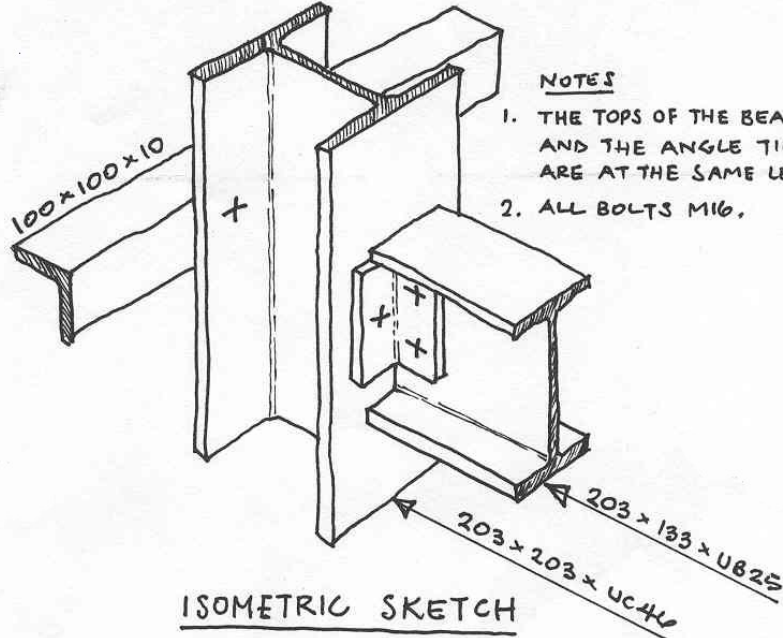
Before



CLEAT
(BOTH SIDES)



ANGLE
TIE



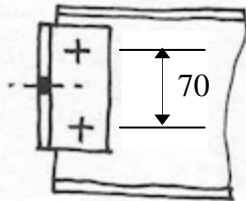
NOTES

1. THE TOPS OF THE BEAM AND THE ANGLE TIE ARE AT THE SAME LEVEL.
2. ALL BOLTS M16.

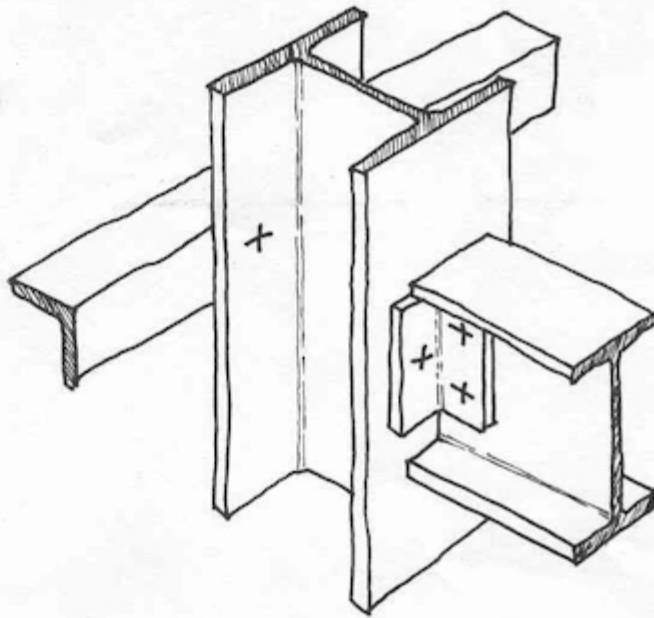
ISOMETRIC SKETCH

After

In this example I have 'airbrushed' the hand lettering and begun to put it back for one of the details using Word. Your joint should be completely labelled using Word.



CLEAT
(both sides)



BORDERS AND TITLE BLOCKS

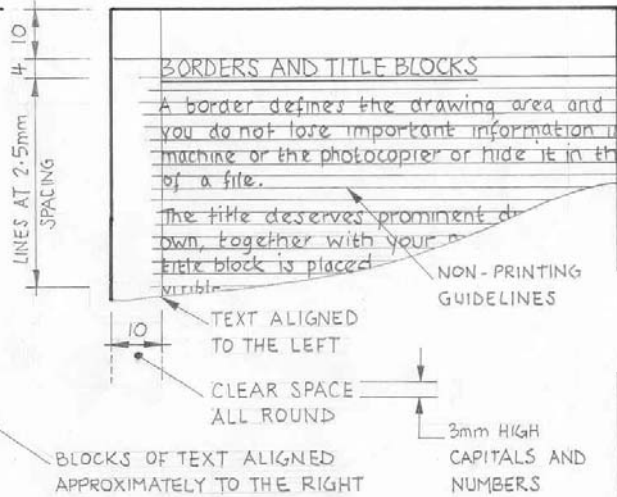
A border defines the drawing area and ensures that you do not lose important information in the fax, machine or the photocopier or hide it in the binder of a file.

The title deserves prominent display in a box of its own, together with your name (to show who is to blame for the work). For larger drawings, the title block is placed and proportioned so as to be visible when the sheet is folded.

LAYOUT

A sketch or drawing may contain all the information required and yet still create an unfavourable impression. Care needs to be taken with the layout of plans, elevations, sections, details, dimensioning, notes and labelling (see next page).

The effective use of space around and between the different elements of the sketch or drawing is crucial. Scales used must be no larger than is necessary to display the level of information required. Lettering, and the hierarchy of lettering, from main title to sub-titles to labelling and notes, must be consistent.



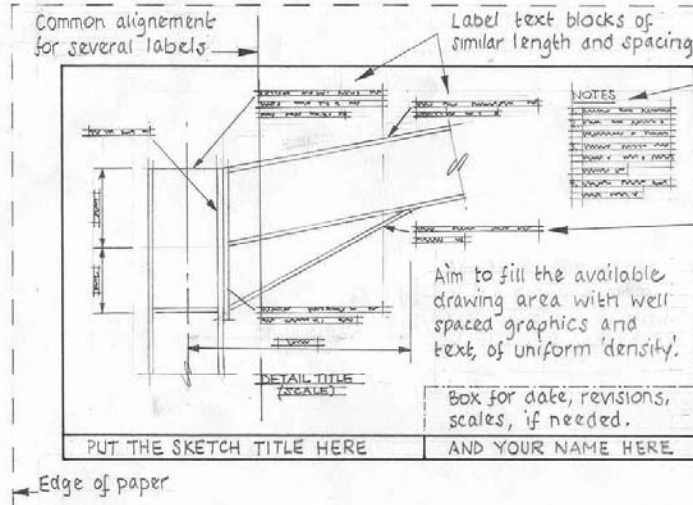
LETTERING

This sheet includes upper and lower case examples at about the minimum acceptable size.

Clear lettering on drawings is much slower than normal handwriting but is much easier to read.

SKETCH PRESENTATION - SHEET ONE

T. SWAILES



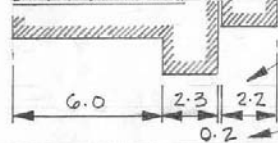
NOTES AND LABELS

General notes may be grouped together e.g. DO NOT SCALE or ALL DIMENSIONS TO BE CHECKED ON SITE. (Such notes may actually mean "THIS SKETCH NEED NOT BE TAKEN SERIOUSLY" or "IT IS NOT MY FAULT").

Labels are blocks of text that are related to the feature on the drawing that they describe by an arrow. Part numbers may be used instead of text only in the case of instructions for multi-part assemblies.

Space labels well away from the drawing and from the dimensioning if possible.

DIMENSIONING



Write "up" for vertical dimension lines.

Space dimensions away from the subject.

Use clear arrows.

Avoid "compression" of small dimensions.

SCALES

- Use only the scales on your scale rule. For example; 1:1, 1:2, 1:5, 1:25, or any of these multiplied by 10, 100 or 1000.
- Minimise the number of scales used.

SKETCH PRESENTATION - SHEET TWO

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