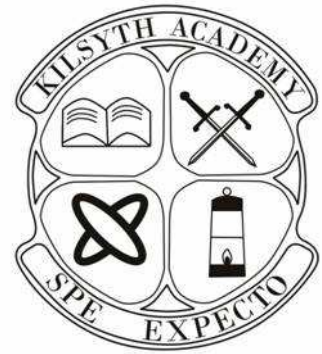


Kilsyth Academy

Technical Department



Higher/Advanced Higher
Graphic Communication

Study notes for

**Knowledge
&
Interpretation**

Page

Introduction

The Higher examination consists of:-

External assessment by examination paper	70%
External moderation of CAD 3D modelling folio	30%

The examination paper is 3 hours long and consists of two parts:-

A - Graphics knowledge

B - Graphics ability

The graphics knowledge consists of 40 marks out of a total of 140.

The following information contained within this booklet contains all the information required to fulfil this aspect of the course.

It is therefore imperative that candidates are fully conversant with the information contained within this booklet.

For the Higher Exam it is suggested that candidates spend 45 minutes on the 40 marks available, approximately 1 minute per mark. This will leave 2.25 hours to spend on the DA (100 marks), again allowing approximately 1 minute per mark + 5 minutes to read each question.

This will also allow 15 minutes to tidy up at the end of the exam.

The Advanced Higher exam consists of:-

External assessment by examination paper	40%
External moderation of CAD 3D modelling folio	30%
External moderation of CAG presentation (Magazine)	30%

The examination paper (3 hours) consists of two parts:-

A - Graphics knowledge

B - Graphics ability

As with the Higher all the graphics knowledge required for sitting the exam can be gleaned from reading this booklet.

The graphics knowledge consists of approximately 30 marks out of a total of approximately 76. (varies from year to year)

This will give around 2.4 minutes per mark.

Types of line used



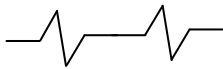
Continuous thick

Used for visible outlines and edges.



Continuous thin

Used for projection, dimensioning, leader lines, hatching and short centre lines.



Continuous thin straight with zigzags

Used for limits of partial or interrupted views and sections if the limit is not an axis.



Dashed thin line.

Used for hidden outlines



Chain thin.

Used for centre lines,



Chain thin double

Used for ghost outlines



Continuous thin irregular

Used as the limit to an interrupted view when an axis is not present.



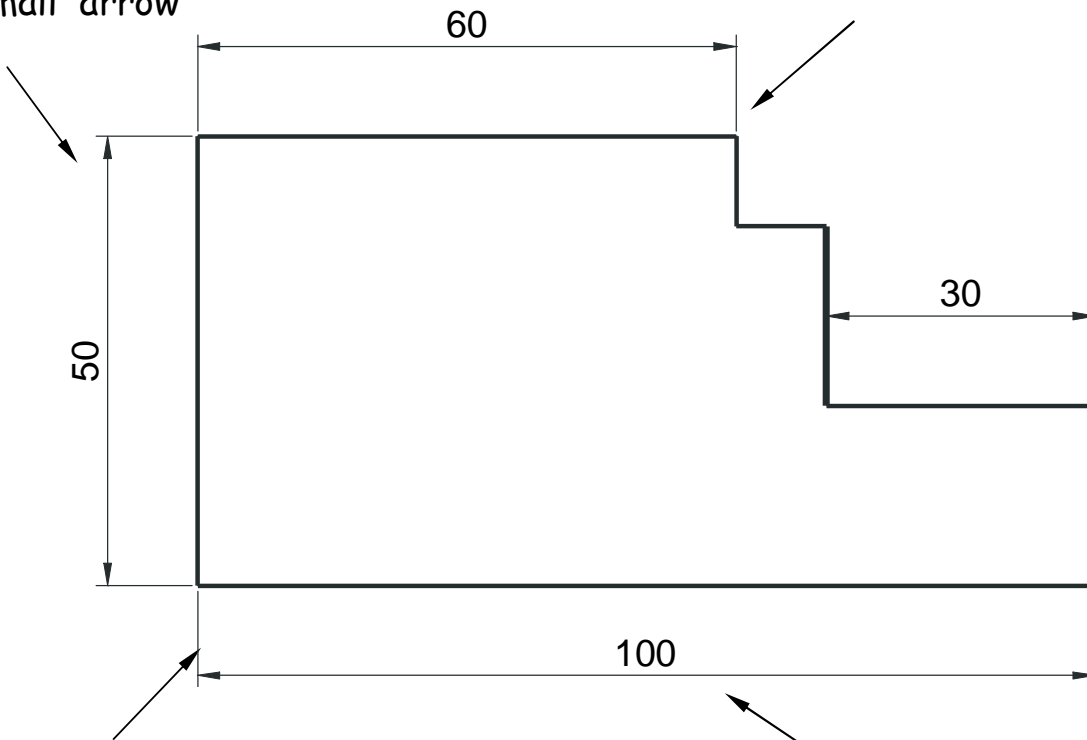
Chain thin thick at both ends and

Used on Cutting planes.

Dimensioning

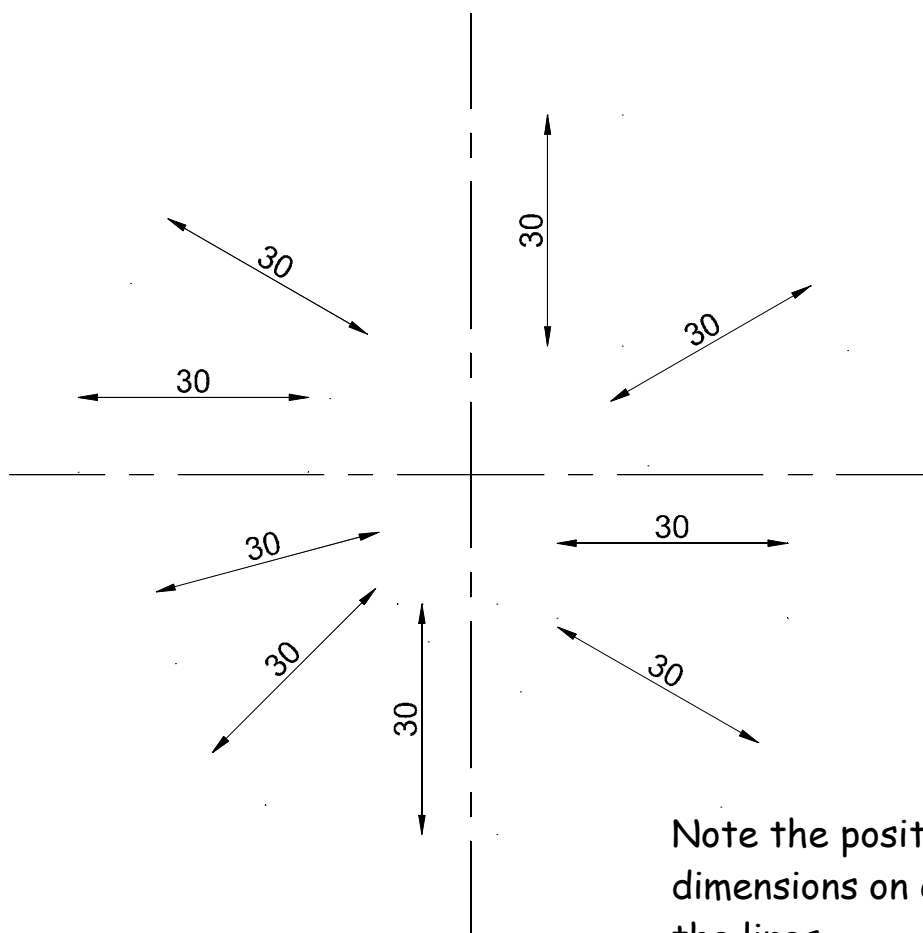
Small gap between Leader and line of drawing

Small arrow

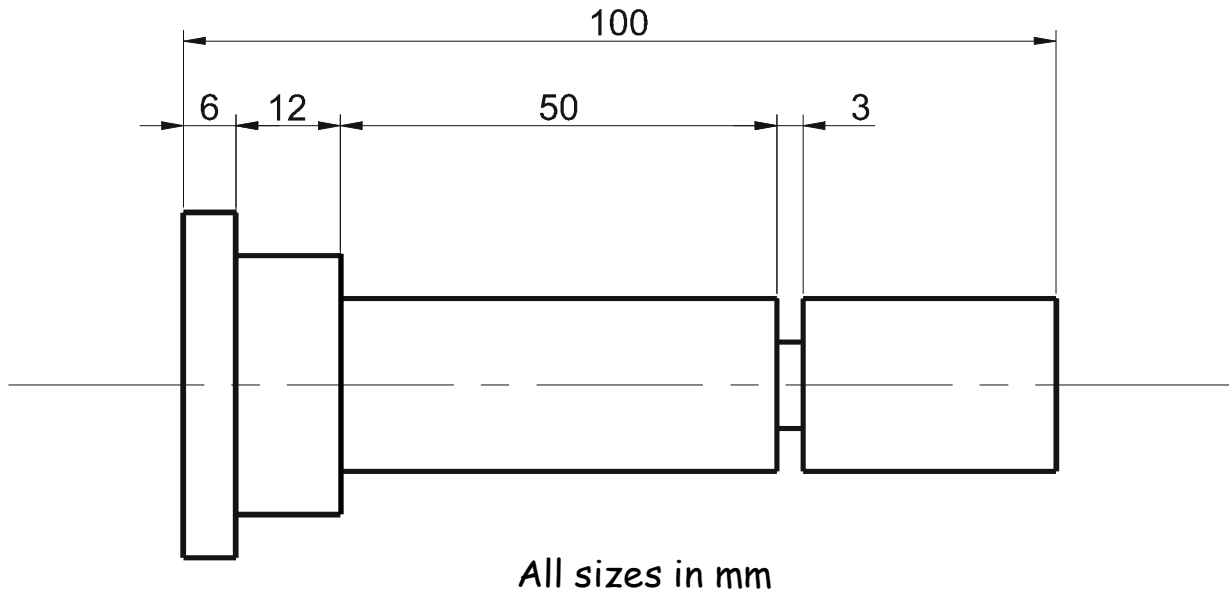


Short extension (Leader)

Dimension



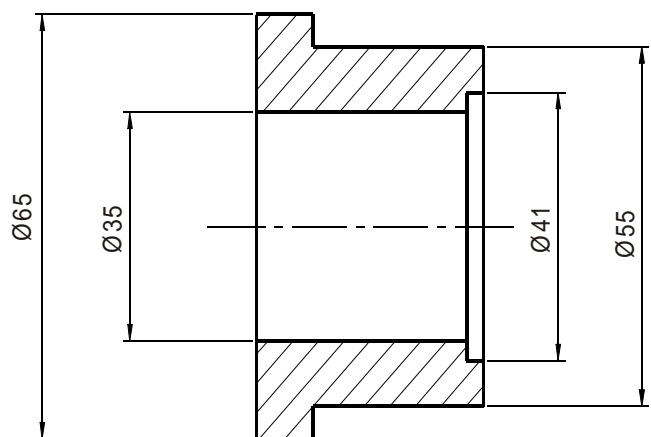
Note the position of the dimensions on each of the lines



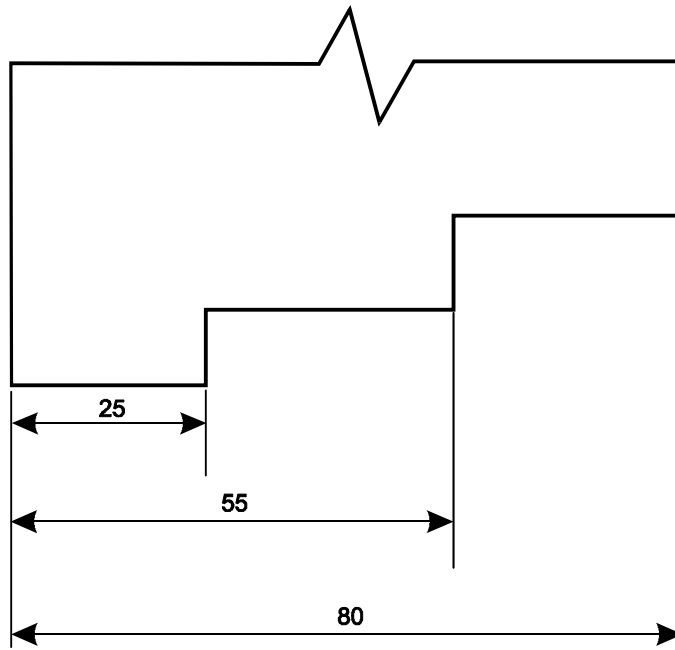
Notice on the above drawing that the largest dimension is placed on the outside of the smaller dimensions. Where there is a limited space for dimensioning, the dimension can be placed above, or in line with, the extension of one of the dimension lines. E.g. the 3mm dimension uses the 50mm dimension leader. It is also important when dimensioning not to include the units of measurement. As can be seen from the drawing above, state on the drawing the unit of measurement. i.e. **(All sizes in mm)**.

The sectioned drawing opposite shows some possibilities for putting a diameter on a drawing. This is by no means the only method.

If the section shown was **Square**, then the following symbol would be used. **45**

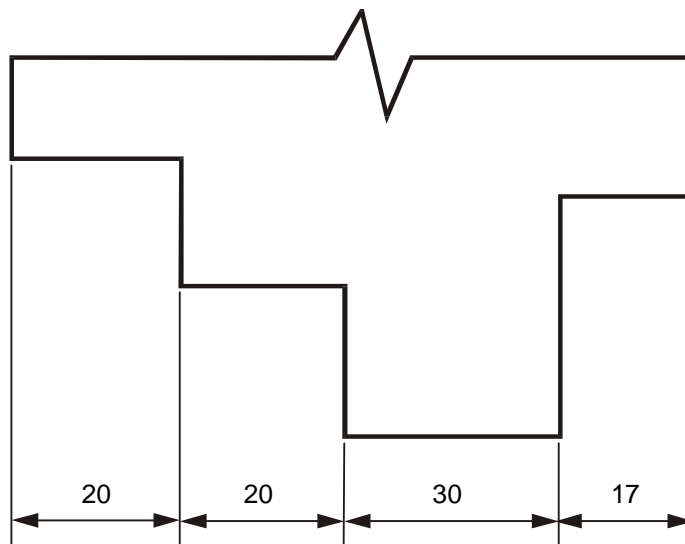


Dimensioning methods



Parallel dimensioning

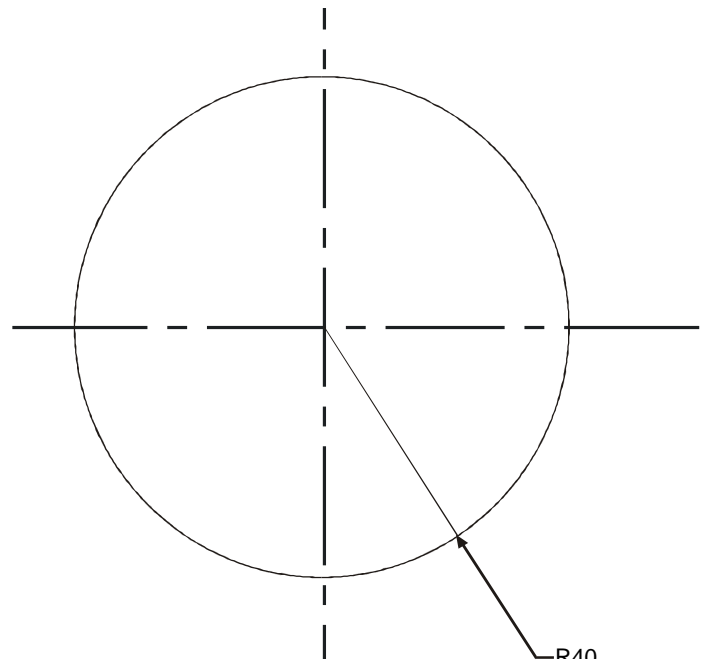
Parallel dimensioning shows dimensions taken from a common datum.



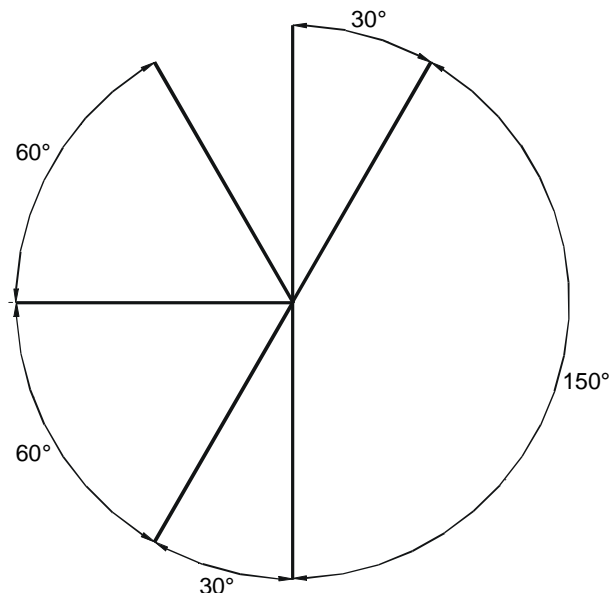
Chain Dimensioning

Chain dimensioning should only be used when the accumulation of tolerances will not affect the part.

Radii should be dimensioned by a dimension line that passes through, or is in line with, the centre of the arc. The dimension lines should have one arrow head only, that which touches the arc. The symbol R is placed in front of the dimension.



Angular Dimensions



Tolerances

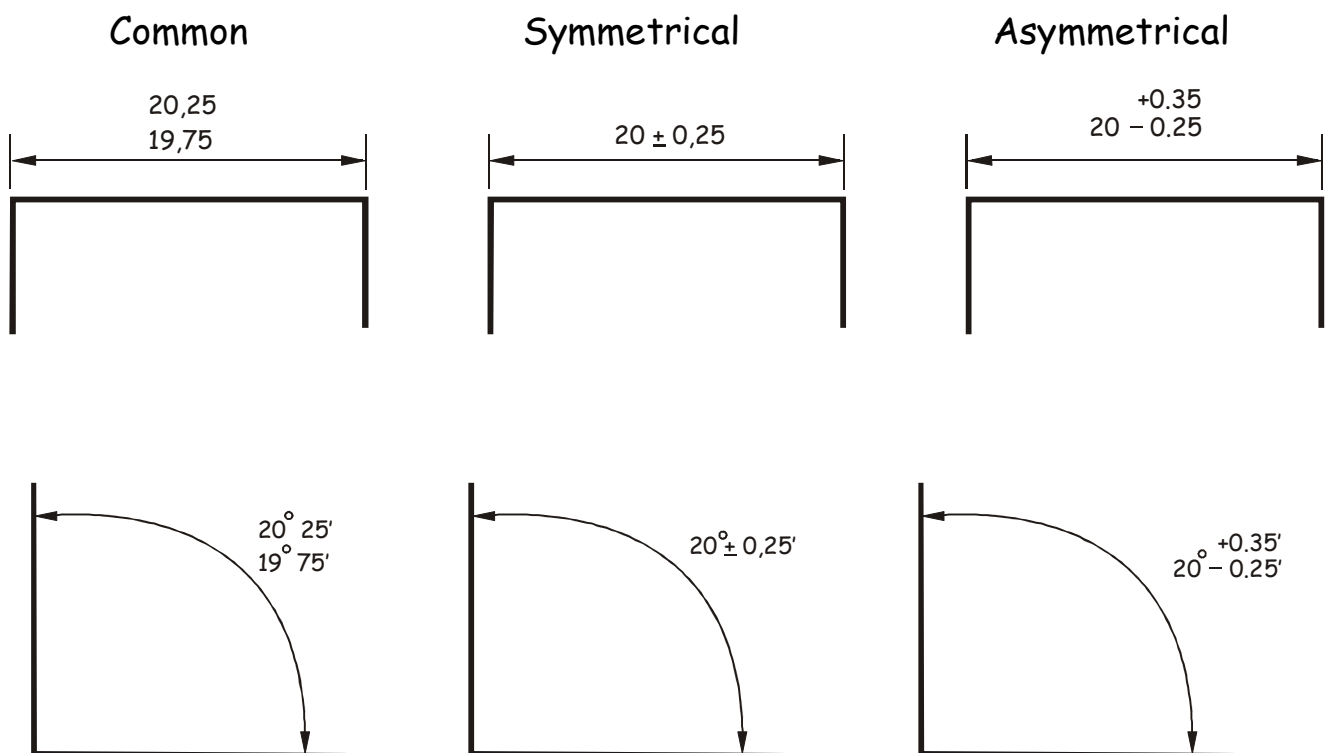
When products are manufactured they, in many cases have to be able to be assembled to other components which make up the complete product. It is very difficult to ensure that the components are the exact size every time, therefore to allow for slight mistakes in manufacturing we use a system called Tolerance. This allows the components to be made within certain sizes which in turn allows for the slight mistakes allowing the components to still fit.

In the first example given overleaf the component has a tolerance of 0.25mm either way. This means the component can be made within the sizes 19.75mm to 20.25mm. The tolerances vary depending what is being made.

In the example shown opposite (*button for TV remote*) the button has been made with a tolerance of $\pm 0.5\text{mm}$. This means that in the manufacturing process it will have a full 1mm allowance. This does not seem a lot but in manufacturing terms is a substantial allowance.



Types of Tolerance

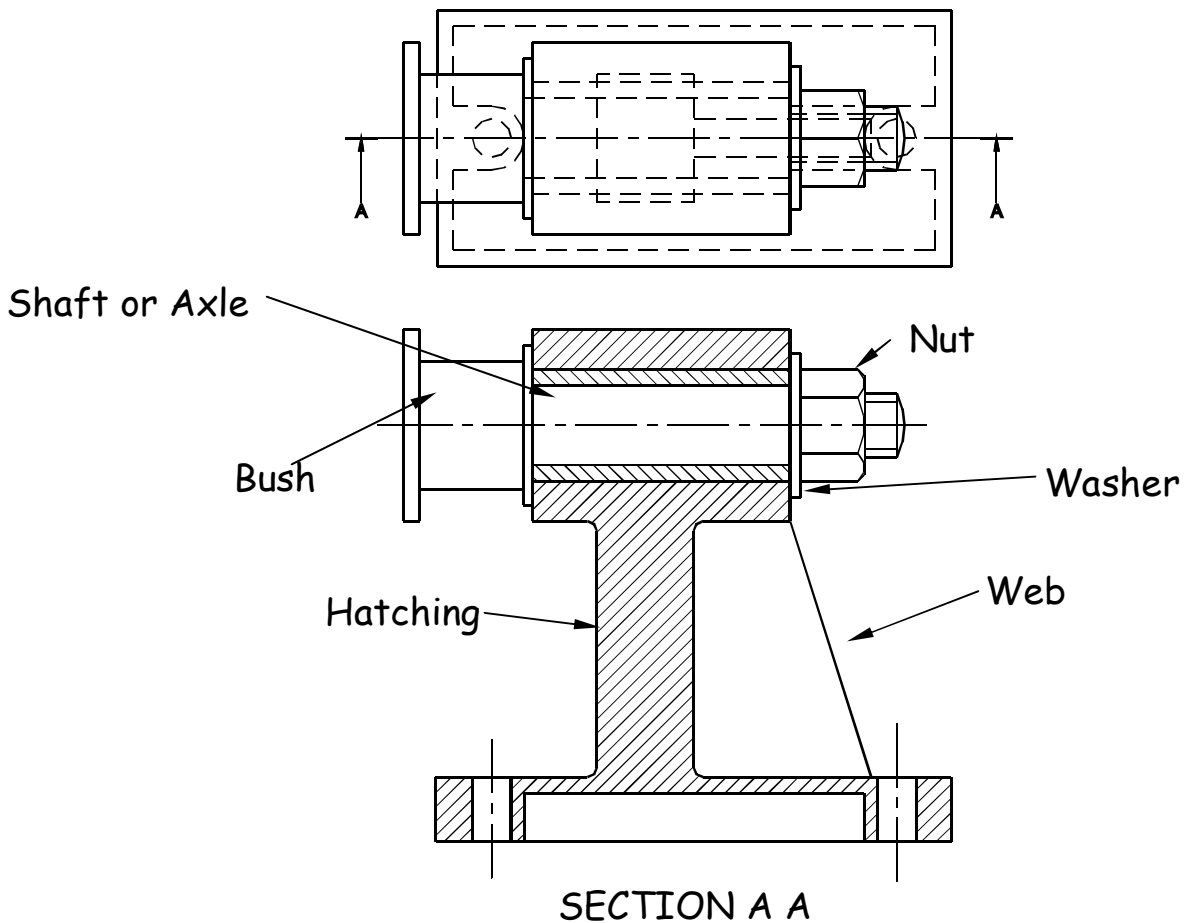


Functional & non functional dimensions

The remote button shown above is an example of a **functional dimension** as it is directly affected by the size of both components. If either was out with the tolerance allowed they would not fit.

Whereas a **non functional dimension** would be the height of the inside button as the height would not affect the fit of the two components.

Sectioned Drawings



Sectional views are drawn to show more clearly what hidden parts would look like.

The cutting plane is shown as a chain dotted line thickened at the ends and labelled with a letter.

Where parts are cut by the cutting plane they are hatched using a thin line drawn at 45° . These lines should be equally spaced at 4mm. Adjacent parts are hatched in the opposite direction.



offset

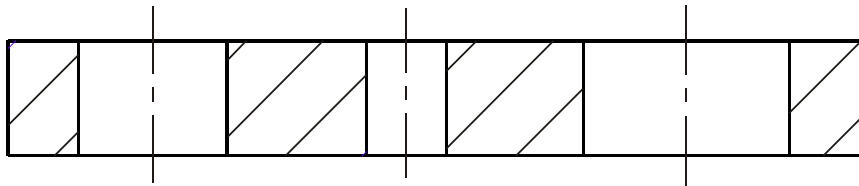
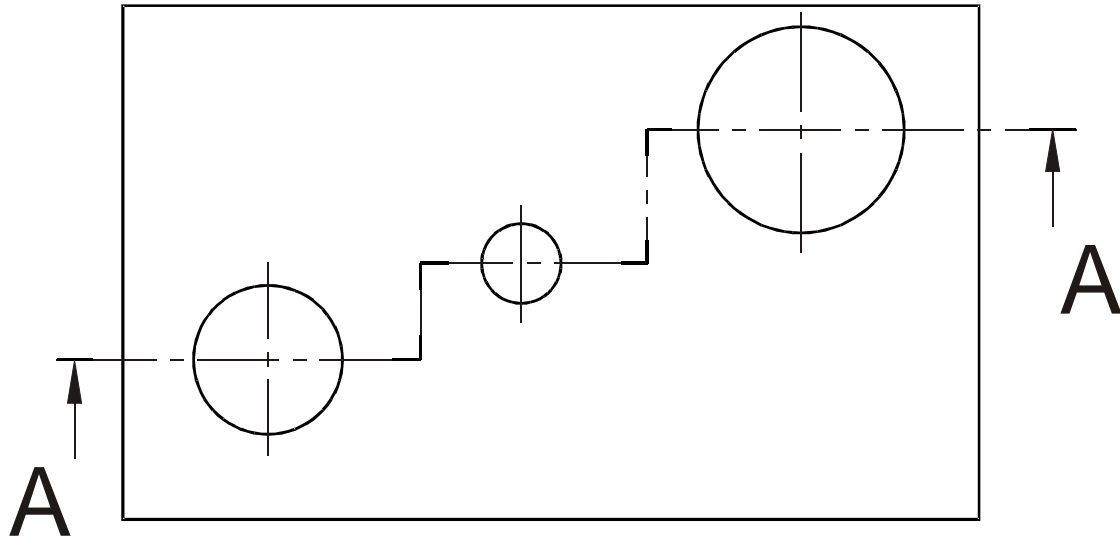


Herring bone

Offset hatching lines between parts. **Do not** produce herring bone pattern. The following parts are **not** normally sectioned:-
Shafts, ribs, webs, spokes of wheels, nuts and bolts, washers and keys.

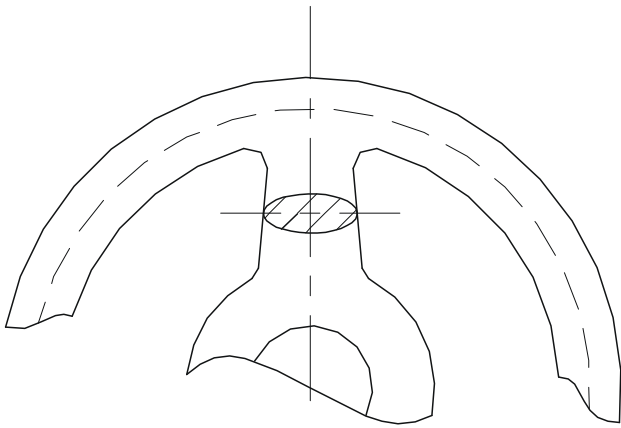
Stepped Sections

(Sectional views in more than one plane)



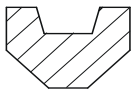
SECTION A A

It is convention to draw these views as if the cutting planes were one continuous plane.

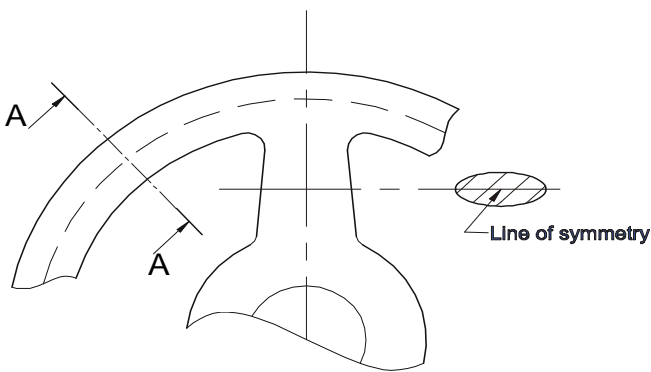


Revolved Section

This type of section, as the name implies, has been turned through 90 degrees to show the reader what the section looks like.

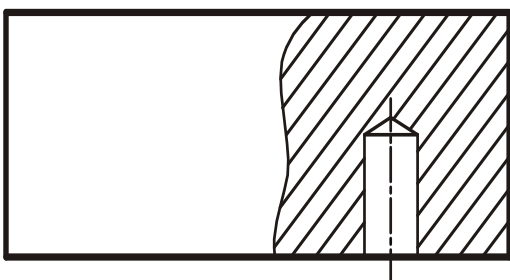


A-A



Removed Sections

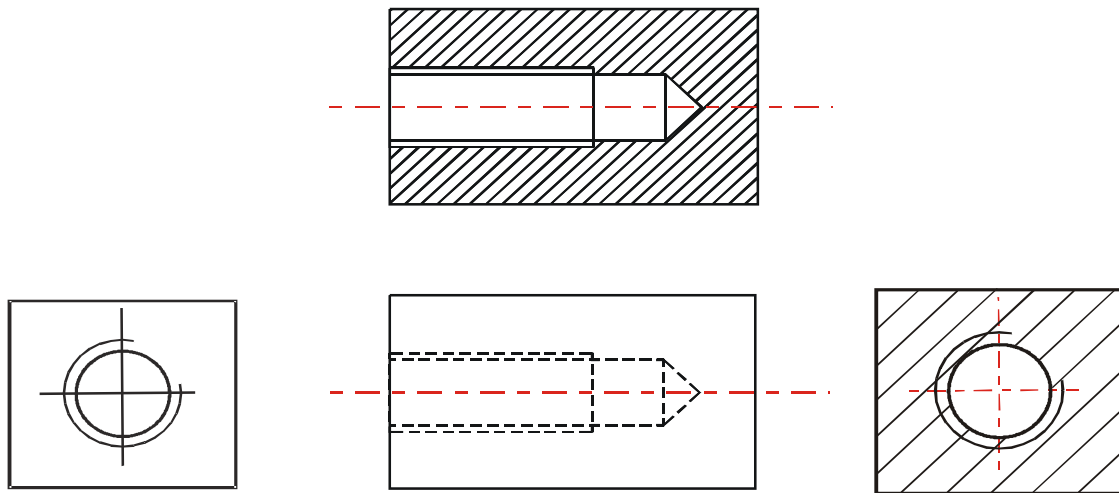
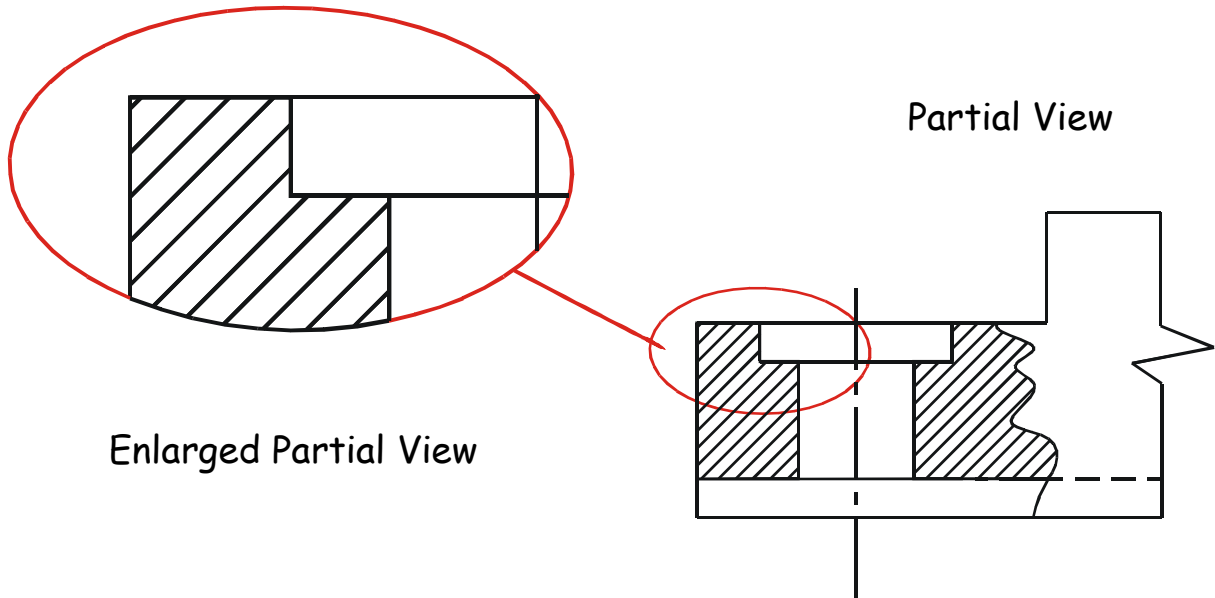
A removed section shows the cut section out with the actual drawing as shown in section A-A. The groove shown on top of the cut section A-A is the top of a pulley wheel which would accommodate a belt.



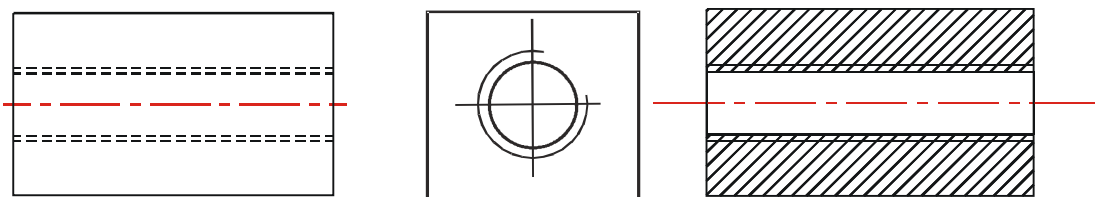
Part Section

This type of cut section only shows part of the component sectioned. It would most likely be carried out to show hidden detail such as this blind

Sections Continued

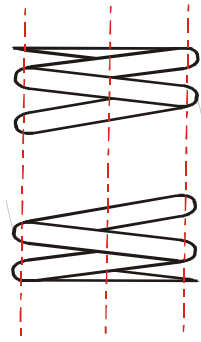


Internal threads (Blind hole)

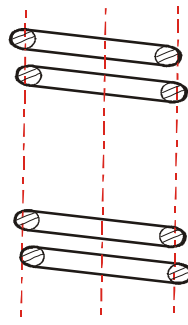


Internal threads (Through hole)

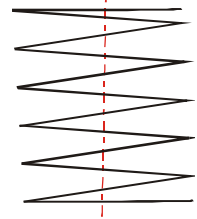
Springs



View



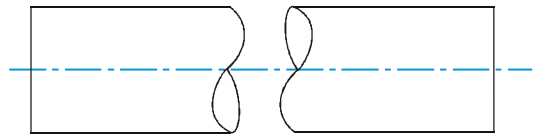
Section



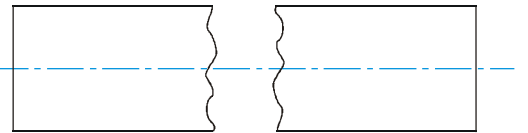
Simplified View

Nuts, Bolts & Shafts

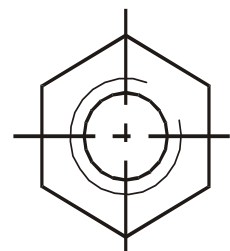
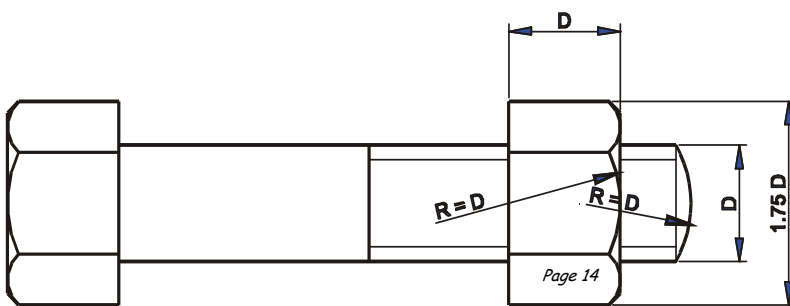
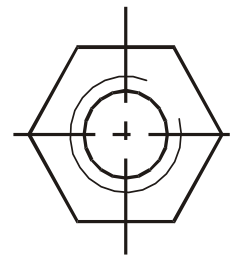
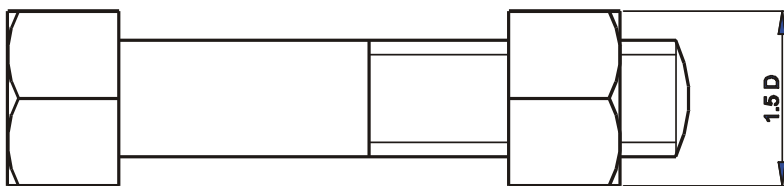
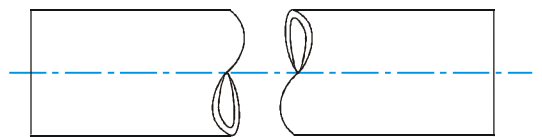
Conventional break lines for a solid shaft

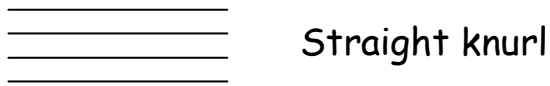
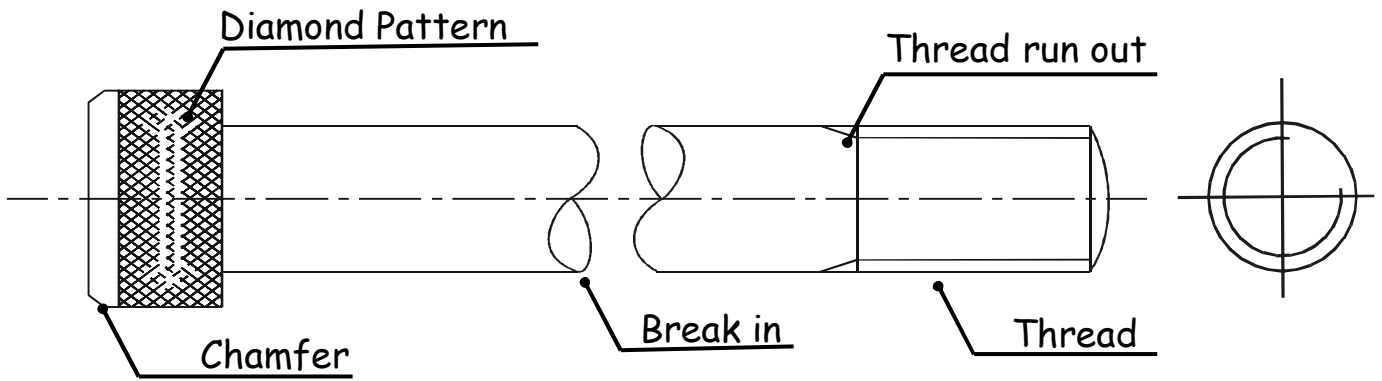


General break lines (continuous irregular used)



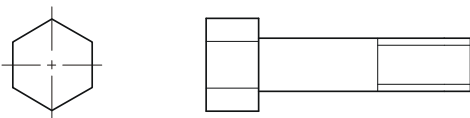
Conventional break lines for a hollow shaft



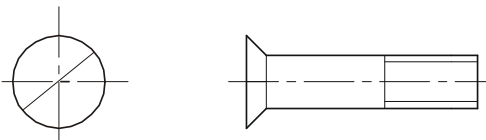


Conventional sizes to draw a nut and bolt are shown. Use these sizes if you have to draw the nut or bolt accurately otherwise use the simplified convention shown below.

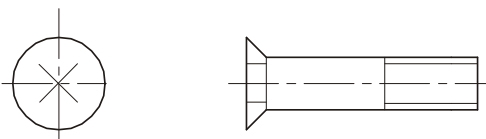
Simplified Fasteners, etc



Hexagon head screw



Countersunk screw, slot



Countersunk screw, cross slot

Construction Symbols



In-line valve (any type)



Softwood, machined



Radiator



Wood, any type, sawn



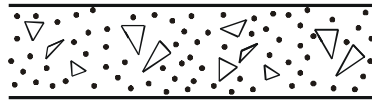
Brickwork



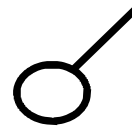
Insulation



Window



Concrete



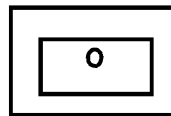
Switch



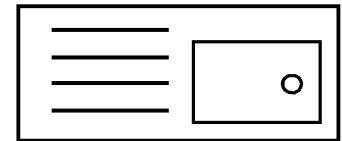
Lamp



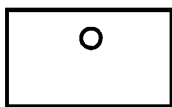
Socket



Wash basin



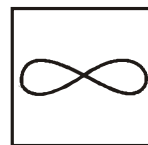
Sink top



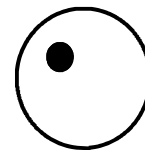
Sink, any type



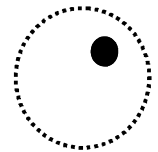
WC



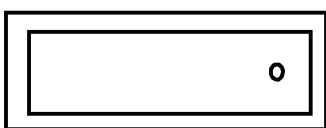
Fan



Existing Tree



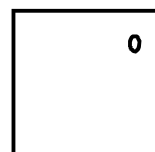
Existing tree to be removed



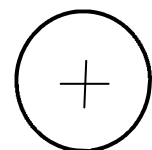
Bath



Door Page 16

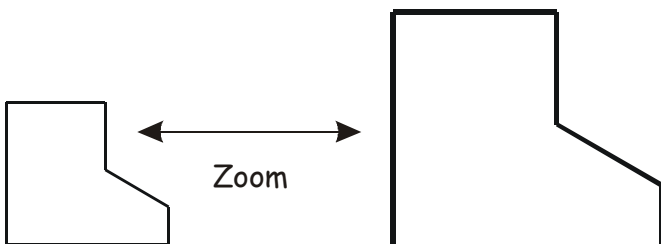
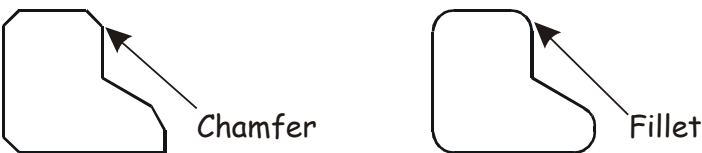
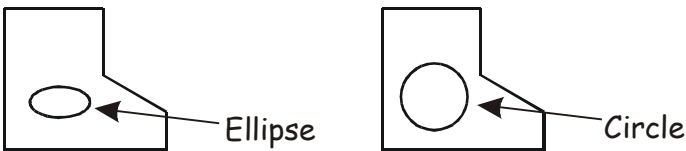
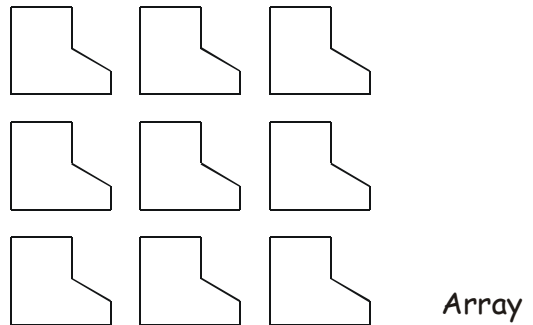
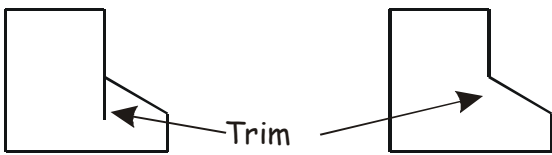
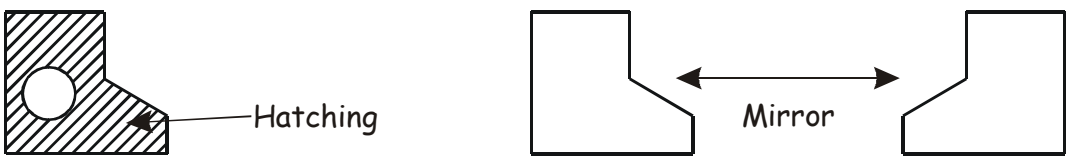
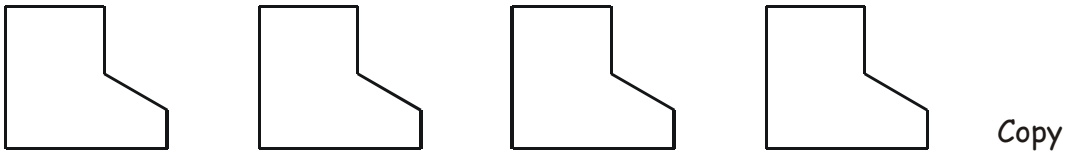


Shower tray



Proposed tree

Common CAD Commands



Copy means to copy an object to the clipboard.
Paste means to paste the contents of the clipboard onto the page.
Undo means to reverse the last command.
Move means to move an object to a new position on the page.
Erase means to remove part of a drawing.

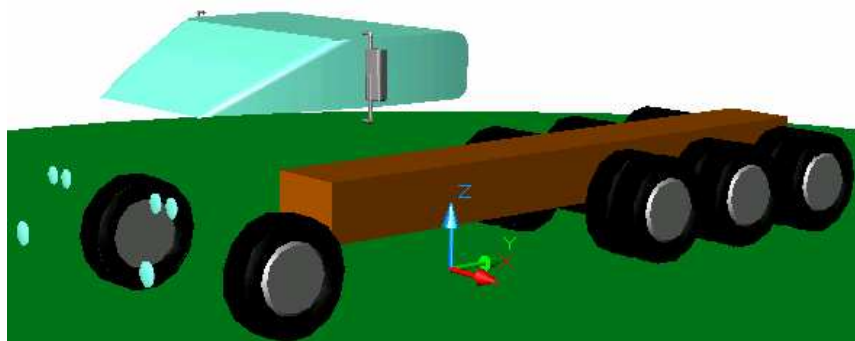
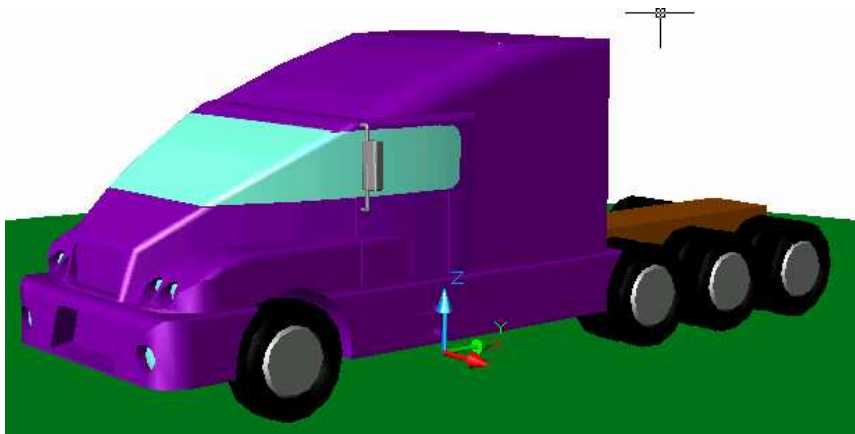
Layering

All Technical/Engineering Drawings should be set out with :-

- Internal lines
- Outlines
- Hidden lines
- Dimension lines
- Text
- Centre Lines
- Construction Lines

In Industry the chances are they will use many more layers than that shown.

The 7 layers listed above is like having 7 pieces of clear paper sitting on top of each other which can be switched on or off as required. The example below shows a truck with its body on in the first drawing and off in the second. This is achieved by simply turning the layer which the body is drawn on, off.



Advantages of CAG over manual drawing techniques.

- Drawings are produced quicker and very accurately.
- Drawings are easier to edit/change.
- Libraries of various parts can be created.
- Lead time can be reduced.
- Quality of drawings are improved.
- Convenience of use (Lap top).
- Standardisation.
- Drawings can be easily scaled up or down.
- Use of layers allows different parts to be drawn separately.
- Easier to store drawings.
- Easier to send drawings to another location quickly.
- True 3D modelling made easy.
- New designs from existing designs.

Disadvantages of CAG over manual drawing techniques.

- Overall cost of hardware.
- Overall cost of software.
- Continual need to upgrade systems to stay competitive.
- Risk of catching computer viruses.
- Staff training costs.
- System faults/crashes.
- Data loss security.

Scales

Scaling drawings allow us to draw exceptionally large objects such as houses on any size of paper available to us. To enable this to happen we have to scale every size (dimension) by the same factor. i.e. taking the example of the house, every dimension would have to be divided by say 100. By doing this we are scaling **DOWN** the size of the house. We can also draw exceptionally small objects larger, examples of which are, the minute electronic chips which are now part of our every day life. They are so small we could not draw them as they are we have to **SCALE UP** the drawing to be able to draw them.

1:1

When we carryout a drawing using the actual dimensions, this is called '**full size**', or the drawing has been drawn to a scale of **1:1**. For every 1mm drawn, 1mm is represented.

1:2

When we carryout a drawing and reduce all the sizes by a factor of 2, i.e. all dimensions are divided by 2, this is scaling down the drawing. This makes the drawing half its original size. What the 1 & 2 represent are, for every 1mm drawn on paper the actual size of the real object is 2mm.

2:1

We can also increase the size of an object by any factor. In the example shown opposite the sizes have been increased by a factor of 2. This will make the drawing twice its original size. The 2 is stating that for every 1mm actual size of the object, 2mm have been drawn. If we increased the object by **10** the scale would be **10:1**. If we reduced the objects dimensions by twenty the scale would be **1:20**.

With respect to Engineering drawings, there are recommended scales for reduction and enlargement. These are as follows:-

Reduction:- 1:2, 1:5, 1:10, 1:20, 1:50, 1:100, 1:500, and 1:1000

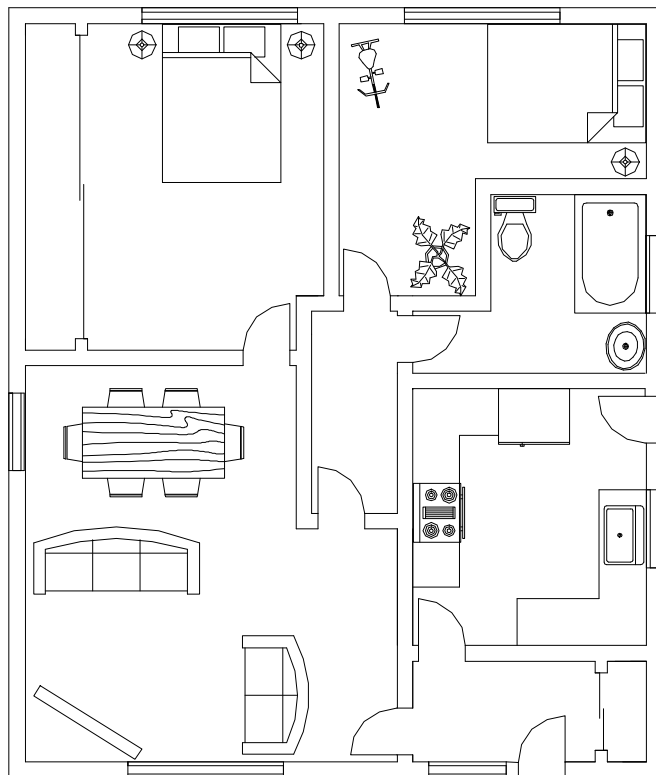
Enlargement:- 2:1, 5:1, 10:1, 20:1, and 50:1.

Scales are used a great deal in building drawings. They are used in three main areas, Floor plans, Site plans and Location plans. Each of the three types of drawings have preferred scales. These are as follows:-

Type of Drawing	Floor Plans	Site Plans	Location Plans
Preferred Scales	1:50 or 1:100	1:200 or 1:500	1:1250 or 1:2500

Floor Plans

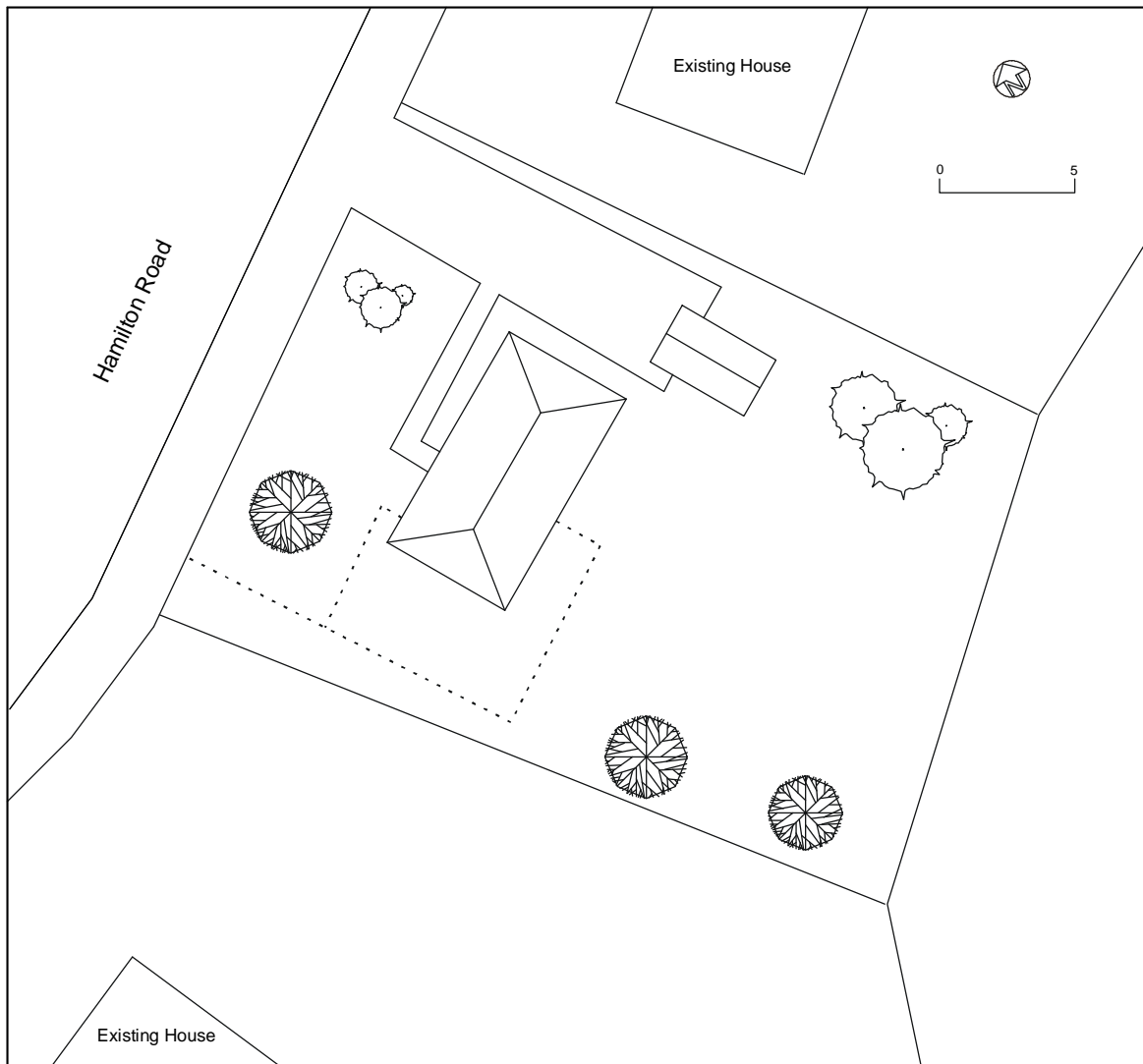
This type of drawing shows the layout of the rooms inside the building and the position of the doors, windows and important fittings like a bath, sink and toilet.



Site Plans

This type of drawing is concerned with one or more buildings which are within the same area and shows these buildings within their own site (or plot) boundary.

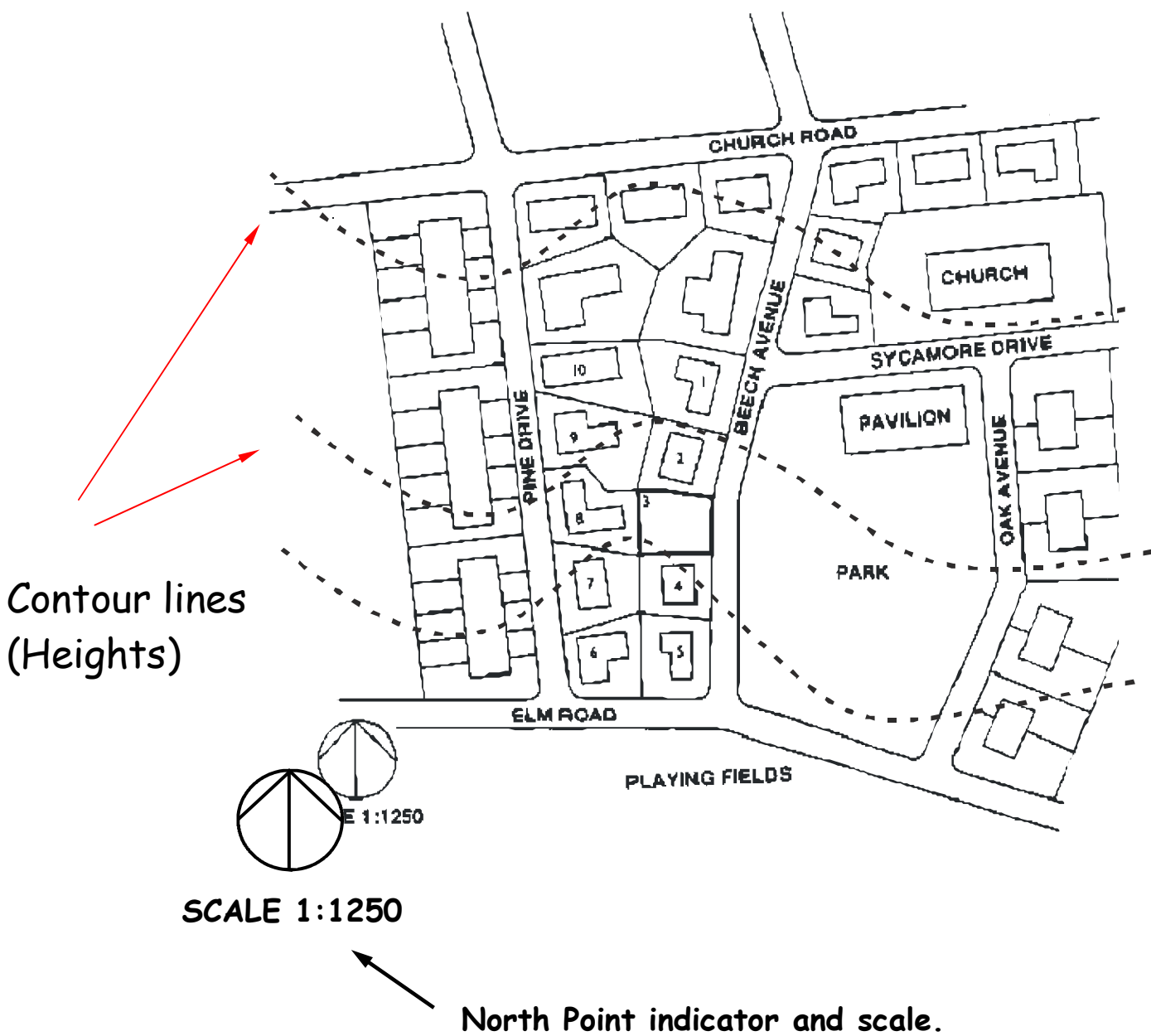
The buildings are shown as outlines and boundaries are marked slightly darker. The scale and the north point are both indicated on the drawing. The site is numbered (usually as plots). Waste pipe runs, manholes and trees are also indicated. Important dimensions are shown.



Block Plans

A **Block Plan** or **Site Location Drawing** shows where the site is located within the local area. It shows roads, outlines of buildings and site boundaries (Garden boundaries).

The block plan below shows where a bungalow is situated within the surrounding area. It is normally drawn to a scale of 1:1250.



The 3 P's

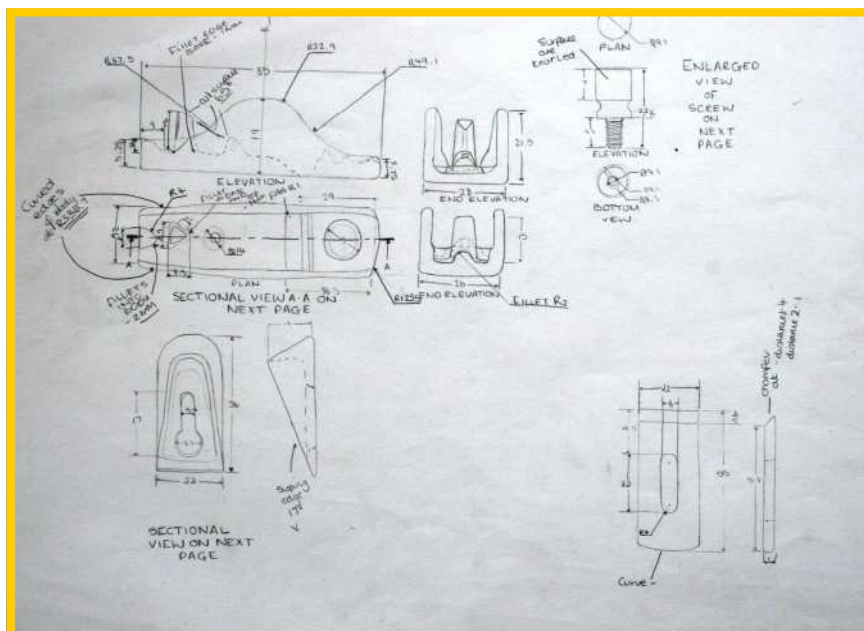
In your thematic presentation you will approach the theme just as a professional designer would, in the world of industry. This is tackled using the 3 P's.

The first of the P's is the **Preliminary Sketches** usually carried out using freehand. These sketches consist of various drawings including all planning towards production and promotional drawings.

The second of the P's is the **Production Drawings** which consist of all drawings enabling the manufacture of the product being designed. The drawings will be in the form of CAD drawings including orthographic, sectioned, exploded isometric, etc.

The third of the P's is the **Promotional Graphics** and consists of all CAG drawings which promote all aspects of the product being designed. This will include posters, fliers, booklets, etc.

Preliminary Graphics

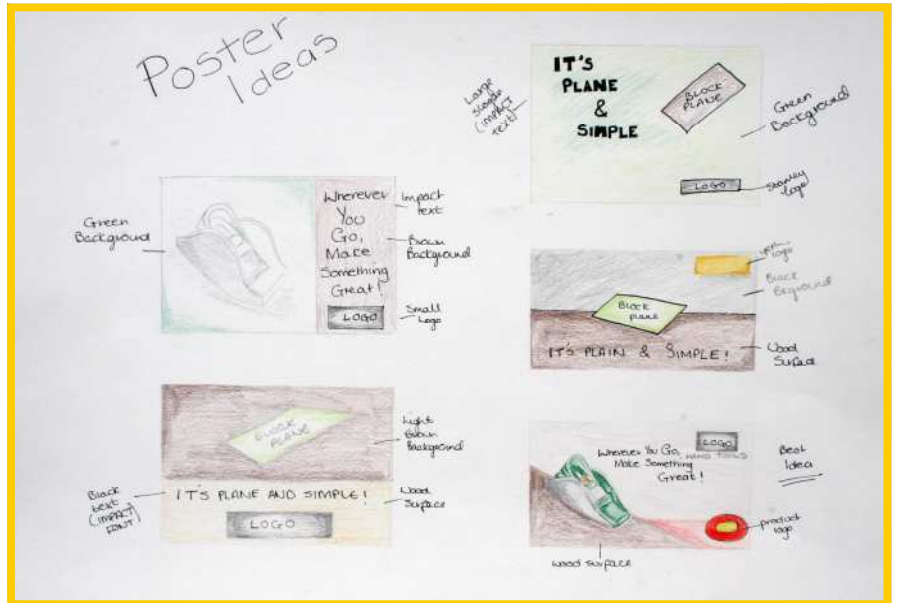


Orthographic freehand sketching

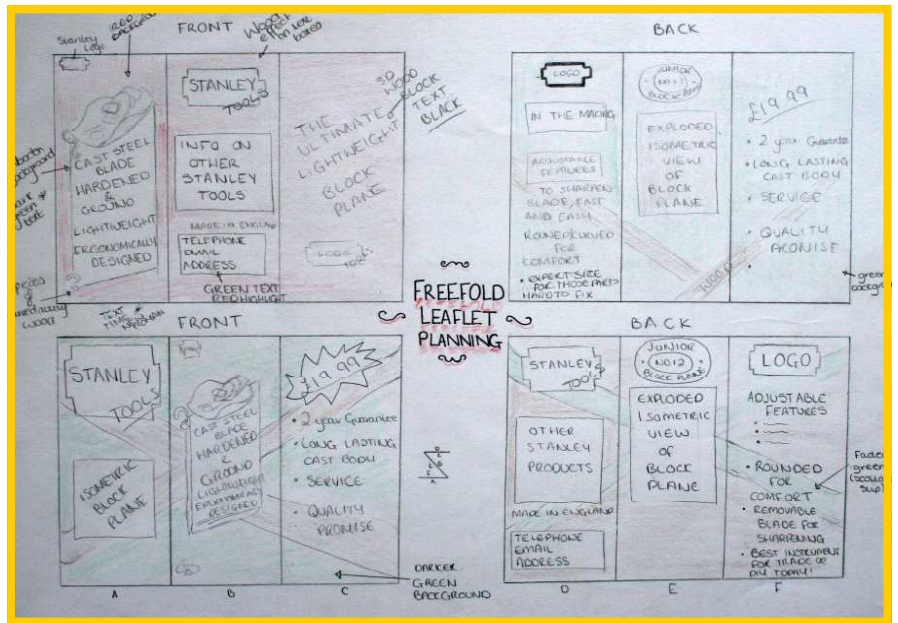
Page 24

Drawn by Emma Napier 2008

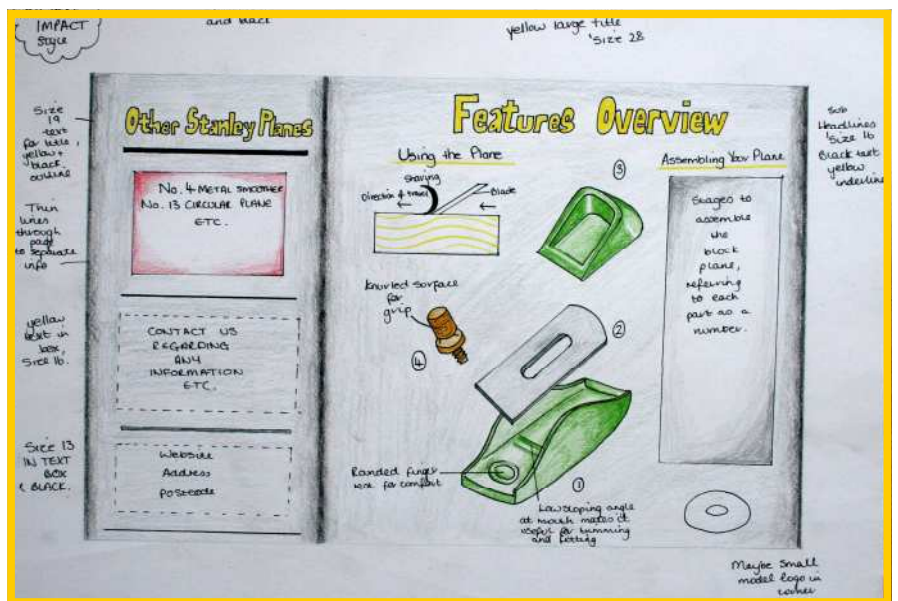
Pictorial freehand sketching



Planning for three fold leaflet

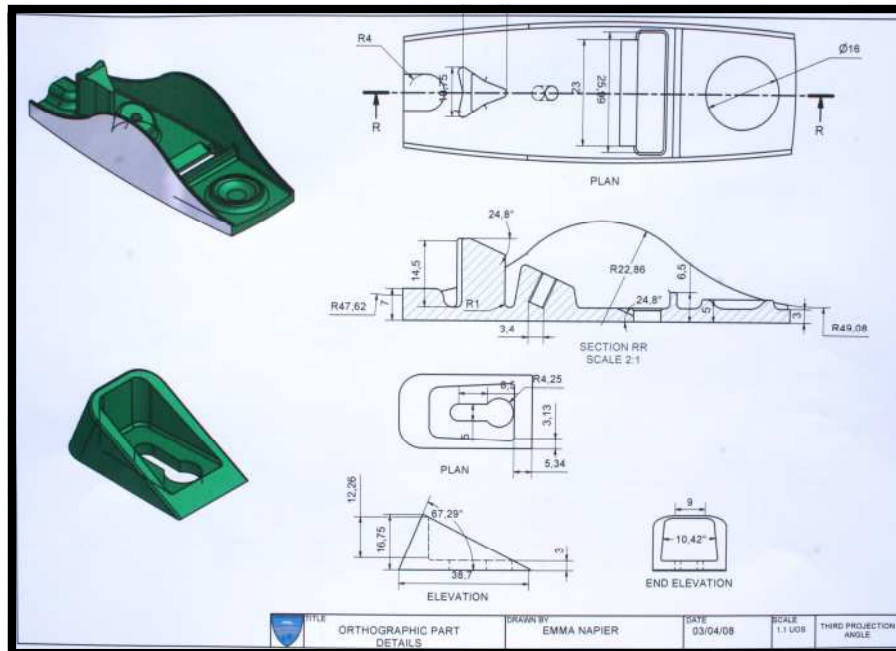


Full size Working Rough for the three fold leaflet

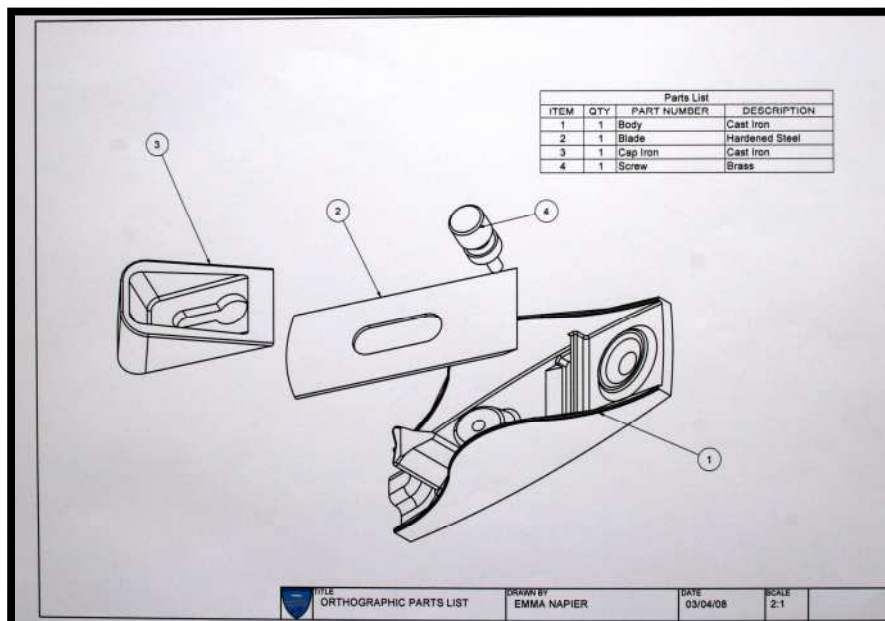


Production Drawings

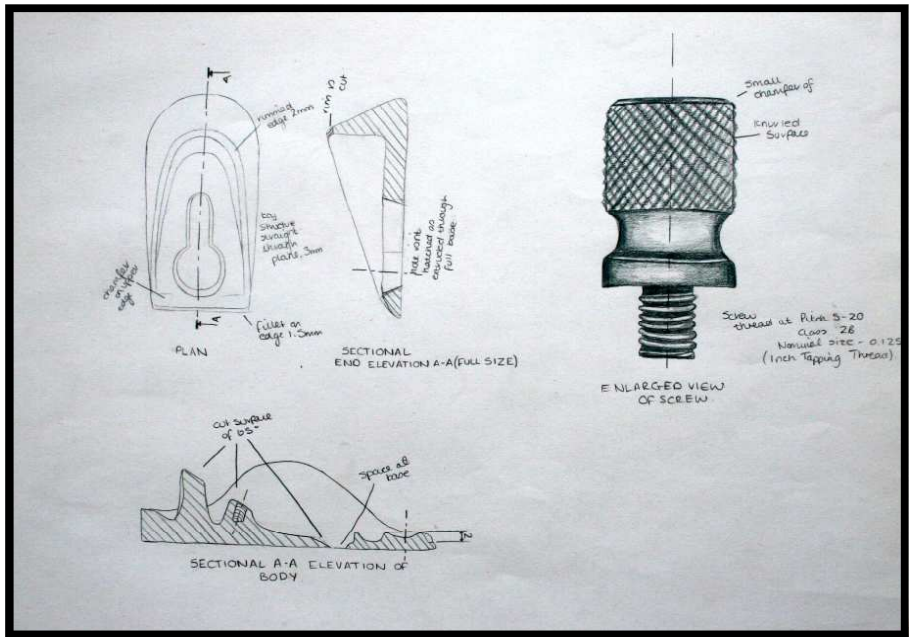
The production drawings as stated overleaf show all manufacturing sizes to enable manufacture of the product being designed.



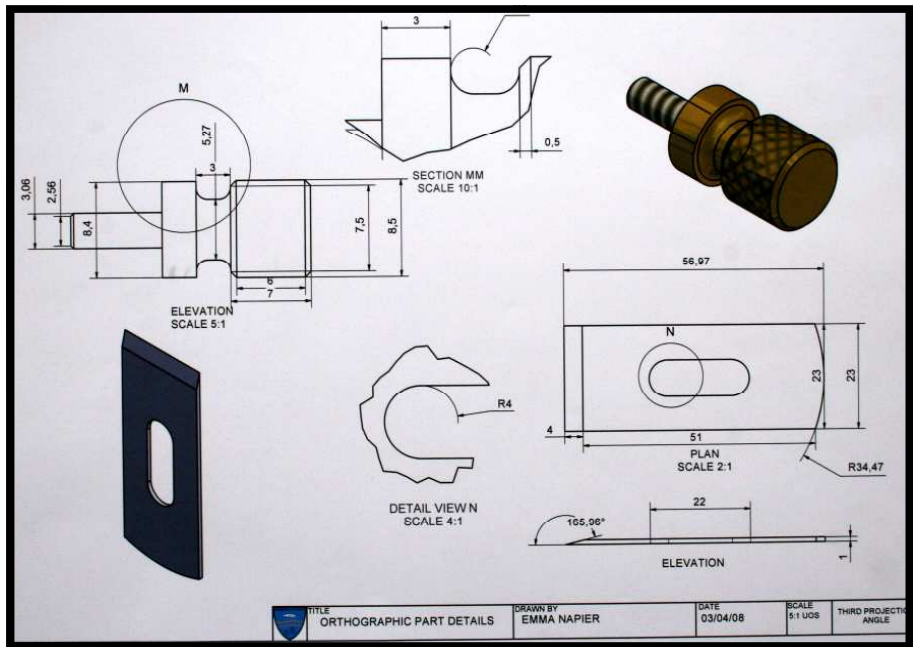
Computer Aided Drawing (Section)



Computer Aided Drawing (Exploded Isometric)



Detailed freehand drawing showing sizes

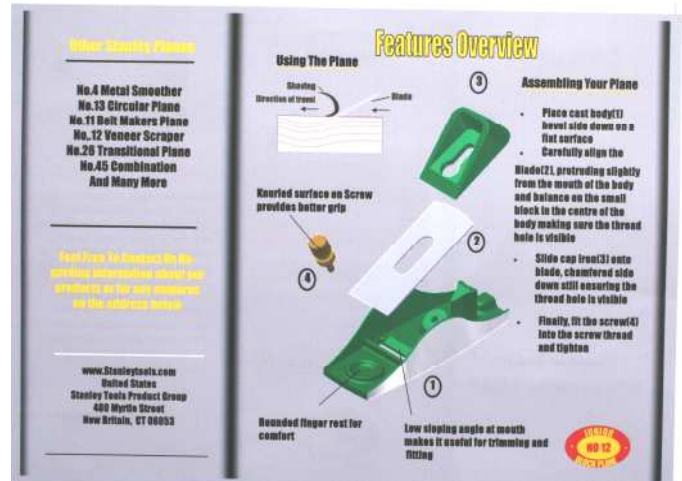


CAD - Detailed orthographic drawing showing various components

Promotional Graphics

The sole purpose of a promotional graphic is to try advertise and tempt potential buyers to buy the product being sold.

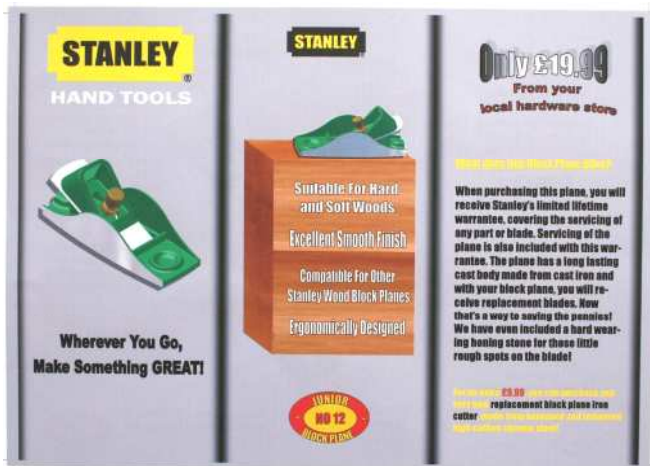
This can be done in a number of ways including, flyers, posters, etc



Shown above and to the side are both sides of a three fold leaflet.

The preliminary sketches of the leaflet can be seen on page 25.

In the examples shown the background fill colour is not an ideal choice as it does not make the product being sold stand out. (It does not contrast well against background)



Glossary of Common CAG Terms

This is a guide to CAG terms likely to be encountered in the course.

CAD Computer-aided drawing.

DTP Desk-top publishing.

CAG Computer Aided Graphics. A term used which encompasses CAD, DTP and modeling.

2D Two-dimensional drawing in which an item is depicted as a flat object. Example: first and third angle orthographic drawings.

2½D Two-and-a-half-dimensional drawing in which three surfaces of the drawn item can be viewed. For example, isometric, oblique.

3D Three-dimensional drawing or model in which the complete object can be displayed, normally in colour, and manipulated to show views from any chosen direction.

Alignment positioning of text in a column or on a page. This can be in the form Left aligned, right, center or justified.

Animation "Bring to life". The manipulation of electronic images by means of a computer to create moving images, similar to creating a film, the computer is giving the illusion of moving parts.

Auto Tracing This where the application software automatically traces round the outline of an object.

Automatic Dimensioning Any system of generating dimension lines in specific locations.

Banner Main headline across the top of a page

Box A rectangular box around text or a graphic

Back-up A term used to describe the processes of making a second copy of drawing files, CAG programs, etc. in case the working copies are damaged.

CAE Computer-aided engineering.

Central Processing Unit (CPU) At the heart of the computer, it controls all other units.

Centre spread Two adjacent pages which can be found in the middle of a magazine.

Column guides non printable guides found in DTP software to allow planning of work

Column Rules vertical lines between columns

Crop to trim excess parts of a screen graphic.

Colour Gradient This where a colour starts off dark and and gradiates to a light colour OR gradiates from one colour to another; e.g. say blue to yellow.

CGA Colour graphics adaptor. A colour adaptor which provides low resolution up to four colours. (320 h x 200 v pixels at 4 colours)

Desk-Top Publishing (DTP) is the creation of a whole publication on computer, preparing it for printing without the normal processes of typing, typesetting, cutting & pasting and laying out. This booklet is produced using DTP.

DPI Dots per inch. A measurement of resolution of output devices. The more dots per inch the greater the clarity of the graphic.

Drop Capital this is a large starting letter which is bigger than the rest of the text. It falls below the baseline.

Drum Plotter A pen-type plotter in which the paper is rotated on a drum under the pen while the pen also moves across the drum.

Dump A colloquialism for transferring what is in the computer's memory to disc or printer or some other output device.

DXF Drawing Exchange Format. A system controlling the format of data interchanged between CAG systems. Drawing files held in DXF format will have the suffix DXF.

EGA Enhanced graphics adapter. A colour adaptor allowing a variety of high resolution modes (320 h x 200 v at 64 colours to 640 h x 350 v at 16 colours).

Extrusion A command whereby an existing 2D (x,y) shape is translated into a 3D shape by addition of the Z depth or length.

Facing Pages Pages which seem to be facing each other in a publication.

File A file is the collection of data of which a drawing is comprised and which has been given a name (filename) by which it can be recognised when stored on disc.

Flat-bed plotter A flat table over which a pen moves in both the X and Y planes.

Footer The space at the bottom of the page where the page number and any other text is placed

Frame a box used to hold an imported graphic or text so as to allow movement around the page.

Frame grab The screen image is captured and stored separately and may then be manipulated by software.

Graphics Processor A special CPU that deals only with the handling of the graphics and screen display.
called digitisers.

Grid All CAG systems provide 'transparent' grids; patterns which appear on the screen as construction aids but do not form part of a drawing.

Handles The small rectangles that surround a selected shape. Text blocks in DTP software commonly have four handles.

Hard Copy Simply means any copy of drawings produced as a plot, printout, or photograph, for example.

Hardware The physical parts of the computer. Example: the case, disc drives, motherboard, floppy discs, etc.

Header Space The space at the top of the page where the number and any other text is placed

Hidden-line removal A CAD command that removes background lines from 3D wire-frame images. Wire-frame perspective views show every line used to assemble a model. To be able to display and plot views as seen in real life means editing out all the lines and planes which would be concealed by other lines and planes. This is known as hidden-line removal and poses massive calculation problems for the computer.

Graphics Tablet A flat-bed input device with a grid of fine wire below the surface. A puck, stylus or light pen will chase the cursor around the screen as it moves over the surface. Useful for 'tracing over' existing drawings to convert them into computer-stored versions, and for making free-hand sketches dimensionally accurate. With overlaid menus they can be used to input symbols from icons. Graphic tables are also, and more frequently,

Housekeeping Embraces all the routines which, although essential to smooth running, do not assist problem solving.

Import To bring in a copy of a text file or graphics, for example from an external application to the page layout application.

Input A term used to describe information that is being sent to the computer.

Joystick An input device which normally moves in two axes. The output from the joystick can be used to control the screen cursor movement.

Kerning The removal of excess space between letters to improve the visual impact of text. For example, in the large type used for headlines.

Landscape Description of the shape of a document page that is wider than it is high. (See Portrait.)

Leading Spacing between lines of text

Laser Printer A non-contact printing device predominantly used in DTP. Laser printers use a laser beam focused on an electrically charged drum which forces the ink to follow the light pattern and form the characters. It is a fast method of printing which also provides very clear images.

Layers CAG software allows drawings to be built up as a series of layers, each layer dedicated to one aspect of the drawing, e.g. construction lines, text, dimensions, hatching, or electrical layout. Layers can be switched in and out and act like clear film overlays which are always in perfect alignment with each other.

Light pen A light sensitive device which can be used as an input device. The light pen is used by pointing it at a raster-type display. Not commonly used in desk-top CAG applications.

Make-up An assembly of all the elements of a document. DTP allows this to be done accurately and creatively and makes it easy to modify.

Maths Co-processor Known also as a maths chip, it processes numbers very rapidly using floating-point notation, 100 or more times faster than a standard CPU.

Modeling/Model A CAG model is more than just a three-dimensional screen representation of an object: it is something which the computer can recognise as having three-dimensional 'shape' and which it can interrogate as such. Any screen display or plot is restricted to two-dimensional limitations, however, the shape exists in computer memory as if it were a solid model.

Montage A collection of separate graphics which when combined make up a new picture

Mouse A mobile hand-held interaction device for controlling the cursor position.

Orphan A line of text that begins a paragraph but has been left at the bottom of the previous column or page. To be avoided in page layout.

Optical Scanning A process in which documents are scanned and the incident light from their contents generates signals which are received by the scanning device and transmitted to the computer.

Rough Manually produced design layout sketch

Pen plotter A drawing device that uses a pen. Any plotter using detachable pens is a pen plotter. There are two main types, flat-bed and drum.

Peripherals External equipment that can be added or connected to the computer. Examples: printers, graphics tablet.

Pixel Picture element. Video and screen displays are made up of tiny dots called pixels. These dots are arranged in a grid and can be set to give typical grid densities of 320 h x 200 v, 640 h x 200 v and 640 h x 400 v dots per grid.

Portrait Description of the shape of a document page which is higher than it is wide. (See Landscape.)

Proof A test print of a document used for checking for mistakes prior to printing

Real time The term used to describe an event that is executed immediately, rather than an event that will be carried out after a time delay.

Register Mark Printers cross-hairs (thin lines) placed outside the page area in order to check that the printed colours are accurate

Resolution The sharpness of definition of a digitised image depending on the number of pixels displayed on screen. Normally defined by the number of pixels shown on screen horizontally and vertically, e.g. 320 h x 200 v.

ROM Read-Only Memory. Its contents are fixed during manufacture and cannot be changed. It is used to store the permanent programs which form the basic intelligence of the computer.

Rubber Banding CAG systems provide for a visible flexible connection between the screen cursor and the position from which it last moved. As the cursor moves away from it, the connecting line seems to stretch.

Screen Dump When a screen image is sent to a printer to obtain a hard copy, the resulting copy is a screen dump.

Simulation This is very similar to animation but with simulation the graphics react to a persons input. i.e. A flight simulator, or a games consol.

Spine Bound edge of a publication

Snap A CAG command that locks or 'Snaps' the cursor to the nearest 'snapable' point. This might be points on a screen-displayed grid, or any point naturally arising as a 'lockable' point (a line-end or vertex). Such 'lockable' points can often be forced into a drawing by special commands. The 'snap' facility is a powerful tool for precision work.

Software The programs which the computer executes. In addition all data files can be classed as software.

Solid modeling The creation of a three-dimensional image on screen, thereafter capable of manipulation to show other views and surfaces.

Surface Modeling A three-dimensional model in which the surface is defined by connecting elements.

Template A dummy publication that acts as a model, providing the structure and general layout for another similar publication.

Thumb Nails Design sketches of page layouts

Type Sizes The standard 'point' system used to describe type sizes is based on 72 points to an inch. (12 points is, therefore, 1/6" high.)

VDU Visual Display Unit: an alternative way of describing the monitor. **VGA** Video graphics array (adaptor). A colour adaptor allowing high resolution and a range of colours. (320 h x 200 v at 256 colours to 640 h x 480 V at 16 colours.)

Widow One or two words at the end of a paragraph that spill onto the top of the next column or page. To be avoided.

White Space Empty spaces on a page, graphic designers use this in publications to create balance on a layout as well as resting the readers eye.

Window A window is a rectangular box that can be used to define a space around an object or set of lines. At its simplest, a window can be a frame drawn around a selected area of the screen, to isolate the area within the 'window'.

Wire-frame model A three-dimensional image made up as a series of connected lines between all edges and line end-points.

Building Blocks

Lines

Lines can be long or short, straight or curved. Lines can be horizontal, vertical, or diagonal. They create patterns. Lines can be solid, dashed, thick, thin, or of variable width.

Sometimes a designer uses a line alone to divide or unite elements on a page. Lines can denote direction of movement (as in diagonal lines and arrows) or provide an anchor to hold elements on a page (such as lines at the top, bottom, or sides of a page).

You can use lines in conjunction with other elements. One well-known example, the AT&T logo, is a pattern of thick and thin lines arranged in a circular shape.

Go through your own magazines with an eye on lines. I want you to find as many different examples of lines of all kinds used in these pieces. Are the lines used prominently? Are they part of a logo or used in other ways to divide the page or add decoration?

Shapes

Circle, square, and triangle are the three basic shapes. Perhaps the most familiar shape to desktop publishing is the square (and rectangle). Paper is rectangular. Most text blocks are square or rectangular. While you may encounter printed projects cut into other shapes, most circles, triangles, and freeform shapes in desktop published materials are found on the page within the graphics or in the way the elements are placed on the page.

Go through your own magazines looking for a variety of shapes. No doubt you can find many examples of squares and rectangles but keep an eye out for other shapes. Are the examples you find actual graphic elements or can you find examples of lines or text arranged in geometric shapes?

Mass

Mass is size. There is physical size and visual size. Size can be relative. A physically small brochure can have a great deal of mass through the use of heavy text and graphic elements. A physically large brochure can appear smaller, lighter by using text and graphics sparingly.

While the paper projects you create have a certain size because of the size

and weight of the paper, visual mass -- how light or heavy it appears -- is also an element of the design.

Go through your own magazines and look at each piece and analyze mass in terms of physical size of the piece and the visual mass. Does it have a heavy, imposing look due to the size or weight of the paper or the density of text and graphics? Is it small and compact or light and airy? Hold the items in your hand to see if they feel light or heavy. Compare the physical size to the visual mass of each piece.

Texture

For desktop publishing, actual texture is the feel of the paper. Is it smooth to the touch or rough? Textures can also be visual. On the Web, especially, backgrounds that simulate familiar fabrics, stone, and other textures are common.

Certain printing and finishing techniques such as thermography and embossing can add both actual and visual textures to a printed piece.

Go through your own magazines looking for as many different types of actual and visual textures as you can find. Can you tell by looking whether a paper will be soft and smooth or rougher? Are the visual textures used in place of actual papers of that texture or do they relate in some way to the purpose of the printed piece (such as a stone texture for a tile company)? See and feel the difference in textures on embossed pieces or other types of raised printing.

Colour

Colour is everywhere. Every single piece in your Class Samples, even if it is black and white, exhibits the element of colour. Colour is used to attract attention. It can be subtle or bold.

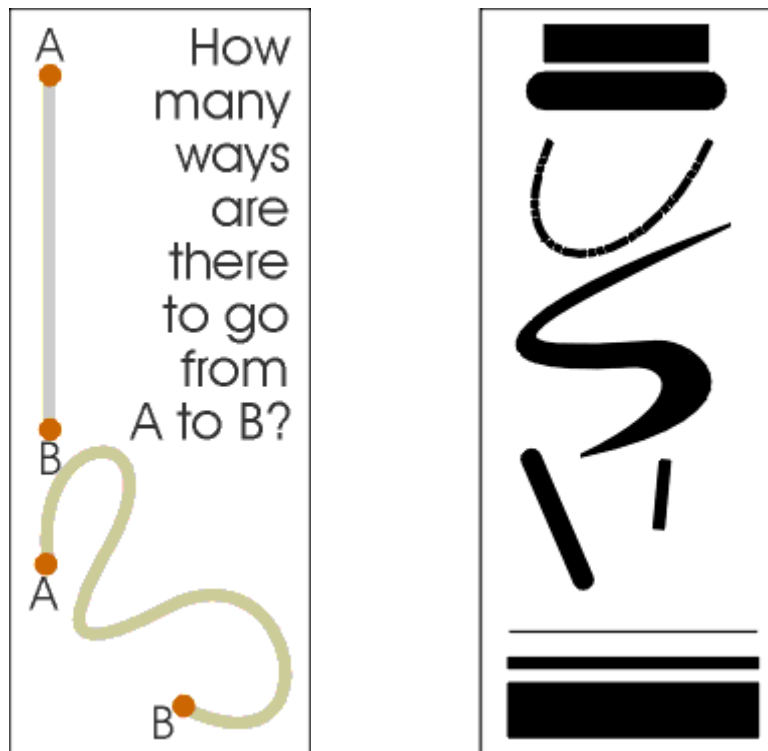
Colour can be found in the paper, the text, or the graphic elements and photos. A monochromatic colour scheme uses a single colour, perhaps in various tints, while other layouts utilize combinations of two, three, or more colours.

1. Colour can be used to elicit specific emotions and reactions. Red is typically thought of as an attention-grabbing, hot colour. Blues are more calming or convey stability. Some colour combinations are used to create a specific identity (corporate colours, school colours) or may be used in conjunction with texture to simulate the look of other objects (the look of plain paper wrapping or neon lights, for example).^{Page 38}

Lines

Appearance

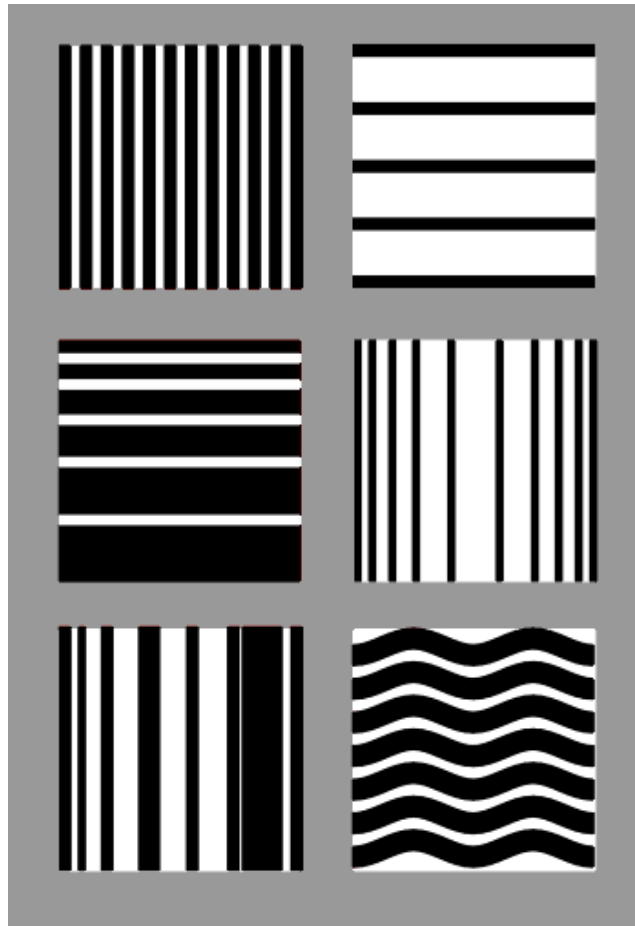
A line is a mark connecting two points. How we get from point A to point B gives the line its distinctive character and appearance. Lines can be long or short, straight or curved. Lines can be horizontal, vertical, or diagonal. Lines can be solid, dashed, thick, thin, or of variable width. The endings of lines can be ragged, blunt, or curved.



Patterns

Lines are often found in pairs or groups. Lines of the same general appearance or lines that are quite different can form a variety of patterns that create textures, suggest movement, or lead the eye — the same as single lines.

If you aren't creating original illustrations or doing logo design, your main concern with this part of the study of lines is being able to recognize these patterns in the illustrations you may select for your work and understand how these patterns may or may not project the image you want for your project. These bits of line patterns illustrate static, dynamic, and random use of lines.



Upper Left: Uniform vertical black and white lines alternate at even intervals. Static. Orderly. Conservative.

Upper Right: Uniform horizontal black lines are widely, but evenly spaced. Static. Stable. Orderly.

Middle Left: Uneven spacing of otherwise uniform lines creates the impression of movement. Dynamic. Orderly progression.

Middle Right: In this example the progression moves in from either side giving the illusion of roundness. Dynamic. Orderly progression. Dimension.

Lower Left: Varying line widths and distances create a random pattern. Dynamic. Chaotic. Disorderly.

Lower Right: While the uniform size and spacing of the lines in the upper examples are static, make the lines into curves and you get movement although it is a controlled movement. Dynamic. Orderly flow.

patterns using only black or white lines that illustrate static, dynamic, or random line patterns.

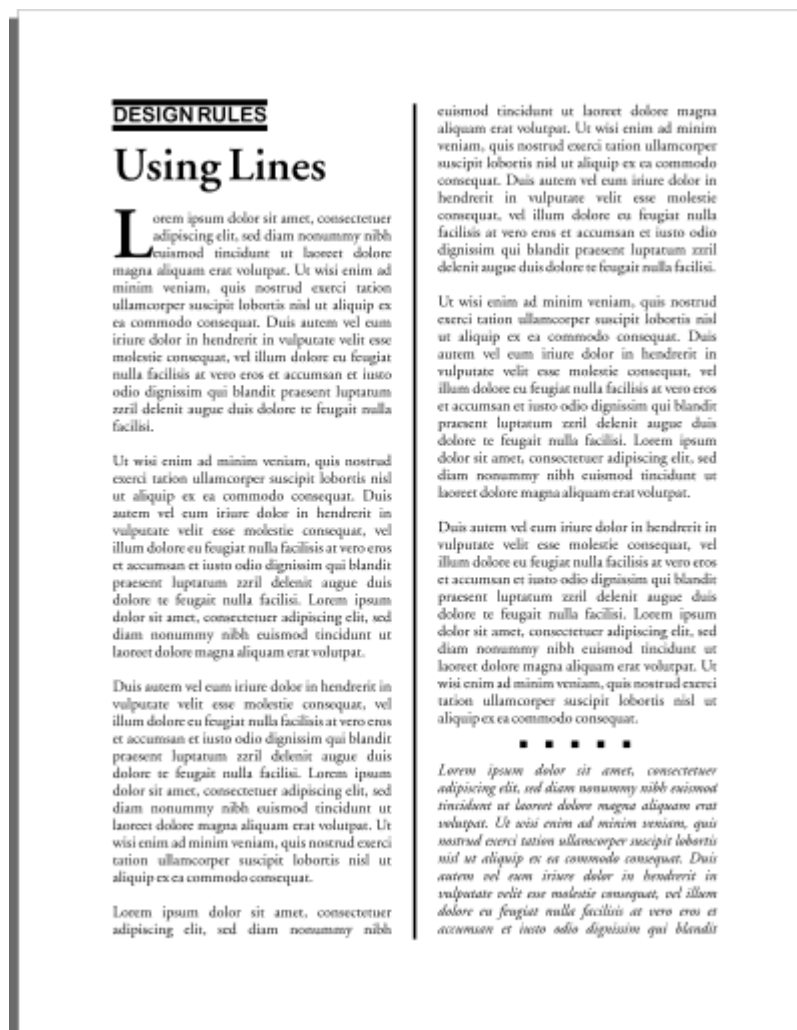
Experiment with line width, spacing, and using horizontal, vertical, curved, and even diagonal lines.

Using Lines

Some ways that you might use lines in your design are to:

- Organize, connect, separate
- Create movement
- Provide texture
- Convey a mood or emotion
- Define shapes
- Provide emphasis
- Provide a framework
-

The examples below demonstrate a few of the ways lines might be used in page layout or illustration. You can probably find examples all around you as well.



In the example on the opposite page, a solid line separates columns of text, a pair of lines set apart a phrase, and a short dotted line separates a section of text from other parts of the page.

A few simple lines added to a piece of clip art gives a sense of movement to the airplane. Short, choppy, vertical lines create a grooved texture along the edge of the timepiece sketch.



Dashed lines suggest a coupon, whether there is one or not. It causes many of us to take a second look at this ad because the familiar dashed line makes us think "I can save money!"

50% OFF

**All Christmas
Decorations**

**Baileys Big After
Holidays
Blow-out all
merchandise
reduced
20-50%**

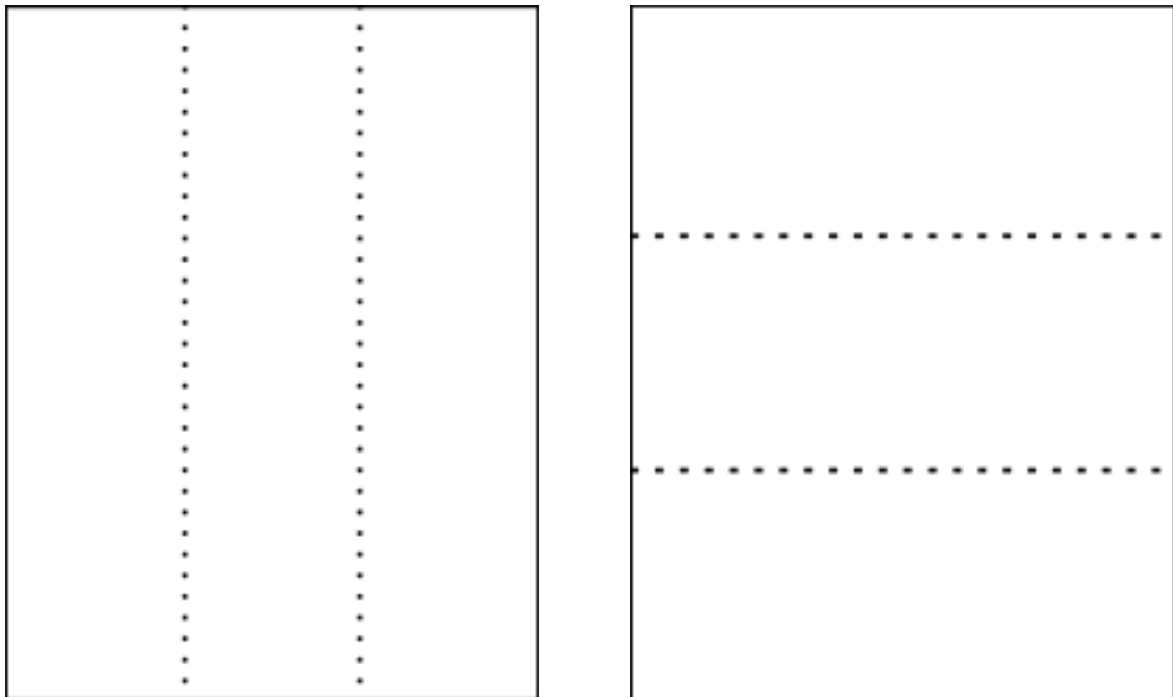
Balance

Rule of Thirds, Visual Centre, Grids

Underlying most of the layouts on the previous pages are three related aspects of page layout.

Thirds

The rule of thirds says that most designs can be made more interesting by visually dividing the page into thirds vertically or horizontally and placing our most important elements within those thirds.



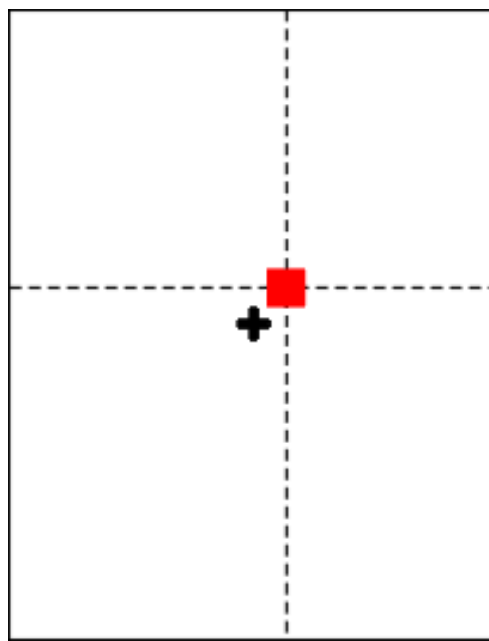
Look at these previous balance examples and see how the rule of thirds is utilized. On the following page the first example a vertically symmetrical layout the headline appears in the upper third of the page, the logo in the middle third, and the supporting descriptive text in the lower third.

Even in this example below the unbalanced asymmetrical design uses the rule of thirds with most of the 'action' in the upper 2/3rd of the layout.



Visual Centre

Placing important elements or the focal point of the design within the visual centre of a piece is another design trick. The visual centre is slightly to the right of and above the actual centre of a page.



See how the focal or centre point of each of these designs actually falls in the visual centre of the page.



Below: It's easy to see the actual centre, it's where the four box corners meet. But the focus is on the earth.



In the example of the calendar below, the months emanate from the year located front and (visual) centre.



Grids

Roughly dividing a page into thirds or finding the visual centre are relatively easy and you don't usually have to be exact to achieve your goals. However, constructing the underlying structure of a piece is a bit more complicated — but essential for most designs. Most balanced designs (and even unbalanced ones) rely on a grid. This invisible structure (visible while working in your page layout program) helps ensure that you place all the elements in the right location to achieve balance as well as to help with continuity and consistency of design.

Grids can be simple or complex depending on the needs of the design and the designer.

Sometimes the use of a grid is obvious.

The example shown below is an asymmetrically balanced design which uses a simple three column grid to ensure that each text column is the same width and that it is balanced by the nearly empty column on the left. The grid also dictates the margins and ensures that the page number and header appear in the same place on each page.



Below: A 5x5 grid keeps this design in line. The grid is obvious along the bottom (each square equals one grid square in this layout) but it is invisibly keeping all those random letters in order in the middle.



Shapes

Squares

The square denotes honesty and stability. Squares are familiar, trusted shapes. Because the vast majority of the text we read is set in squares and rectangles, it has become familiar, safe, and comfortable.

Squares and rectangles are probably the most common geometric shapes we encounter. A few books, especially those for kids, may be cut in irregular shapes but adult (i.e. 'serious') correspondence comes in squares -- both the physical shape of the books, magazines, newspapers, and the rectangular columns of set text.

Some designers might equate square with boring. It's true that other, unexpected shapes, can grab attention better than the simple square but don't forget the importance of comfort and familiarity. Imagine how difficult it becomes to file everyday correspondence if letterhead came in a variety of triangles or freeform shapes. Try reading an entire book with all the text set in circles. Squares and rectangles definitely have a place in design.

Some ways you can use squares and rectangles:

- To symbolize honesty, stability, equality, comfort, or familiarity. It could also symbolize rigidity or uniformity.
- Related to the first bullet item, use repeating squares to suggest familiar themes (checkerboard pattern to represent a game board, the checkered

flag at the end of a race, a tablecloth).

- To highlight, organize, or set apart information using a solid or outlined box.
- Use a square unexpectedly. Set a block of text in a solid or outlined but tiled box — with or without also tilting the text.

Circles

Circles suggest infinity. They are also protective (think of protective encircling arms). They can also denote free movement such as a rolling ball or a more controlled movement such as a spinning globe. The sense of movement is often enhanced through shading or the use of lines.

Outside of logo designs, circles are less common elements of design which makes them good for grabbing attention, providing emphasis, and breaking up familiar rectangular blocks of text. You could set text in circles or simply use a circle as the background for more traditional blocks of text.

Some ways you can use circles:

- To symbolize infinity and protectiveness. Circles could also suggest something well-rounded or complete. Similar to protectiveness, circles could also imply security.
- Related to the first bullet item, use circles to suggest familiar themes (bullet holes, a stack of cannonballs, a bunch of grapes -- or just about any round fruit or vegetable, a target, the earth).
- To highlight, organize, or set apart information using a solid or outlined circle. Try a freeform circle that looks like it was drawn with a marker or pen to highlight important text.
- Replace the letter O or other 'round' letters in text with a circular shape that suggests that letter. Try an orange in the word Orange or a basketball, baseball, or soccer ball to replace an O or other letter in the nameplate of a sports newsletter.

Triangles

Triangles suggest action. They are dynamic. Triangles may convey either

conflict or strength. Triangles can direct movement (up, down, left, right — depending on which way they 'point') but rather than moving themselves, they point the way for the reader.

Triangles are suggestive of many different shapes and ideas. They can represent a religious Trinity, a pyramid, a flag or pennant, an arrow, a beacon.

Some ways you can use triangles:

- To symbolize action or conflict. In a logo, a triangle might be better suited to a growing, dynamic high tech company than the more stable, familiar square, for example.
- Related to the first bullet item, use triangles to suggest familiar themes (flag, pyramid, arrow or pointer). A single or a series of triangles can point the eye to important information or act as an arrow to get readers to turn the page.
- To highlight, organize, or set apart information using a solid or outlined triangle. Use a triangle to suggest progression. Place it behind a 'Top 10' list or the steps to accomplish a specific task.
- Replace the letter A or V in text with a triangular shape that suggests that letter. Try a wedge of pie for the letter A in the phrase Amy's Desserts.

Mass and Size

Defining Mass

As stated in the introduction, mass equals size. Each piece you create has a physical mass. The physical mass or size is the actual dimensions of the piece — height, width, thickness/weight (of paper), and depth (3D objects).

Additionally, each element within the design (graphics, photos, lines, text blocks) have their own mass relative to the whole piece. For example, a photo that is physically 3 inches by 5 inches can appear smaller or larger depending on the physical size of the paper it is printed on and the size and proximity (closeness) of other items on the page.

Some ways to use mass within your designs:

- **to accommodate information, content** Example: To present all the desired or needed information comfortably a designer may create a bi-fold rather than the usual single business card.
- **to accommodate normal size restraints or expectations** Example: The postal service has limitations on the height and width of different types of envelopes. If a designer ignores those requirements it could incur additional mailing costs for the client.
- **to convey a mood or provide emphasis** Example: A place that is physically large (such as an amusement park) or a business that offers a huge assortment of products may use brochures or other marketing pieces that are larger (physical dimensions) or heavier (weight) than normal to carry out the 'bigger' or 'more' theme.
- **to create contrast** Example: A designer might design a full-page magazine ad using a single small image in the middle of the page with lots of white space. The contrast between the size of the page and the size of the content (image) draws attention to the image and can create a specific mood (depending on other elements) such as conservative, elegant, lonely, or open.

Measuring the Size of Your Design

What is large? What is small? In graphic design and desktop publishing there are many ways to specify size. This part of the class on mass focuses on the mechanics of size and common measurement systems used in desktop publishing..

Expect to spend a great deal of time on this portion of the course.

What you learn here is critical to DTP.

To keep from getting lost, bookmark this page now. You can come back to this page if you get 'lost' in the many pages and supplemental materials covering size and measurements.

Auxillary Materials: [Size Matters](#)

This multiple page complex covers the following topics:

Type Sizes (1 page),

Using Picas in Page Layout (1 page),

Paper Sizes (1 page),

Image Sizes (5 pages),

Conversion Tools (1 page).

In addition to the main coverage of each topic you'll find that many pages have a *Glossary* section with related terms, or *How-to* pages related to that topic. These pages are not included in the 'page count' for those topics but are important supplemental information. Review them.

It will take several days or even longer to absorb all this information.

Texture

Paper Textures & Finishes

Paper is often something we take for granted. It's just 'there.' Sometimes we have no choice about the type of paper on which our designs are printed. Normally we can't dictate the paper used for ads in newspapers or magazines. Even when we do have a choice, we're limited by budget, printing requirements, or other factors. However, paper can be an important textural element in our desktop published documents.

Some papers just 'feel' better than others. Grab up some paper from around you. Get a newspaper, a magazine, some paper from your printer, and a few different samples from your Class Samples. Close your eyes and touch the different surfaces. Can you identify the general type of paper (newsprint, etc.) simply by touch? Probably so. But also consider how they feel to your touch — smooth, rough, slightly patterned, fuzzy, bumpy, slick, shiny, dull, warm or cold.

Familiarize yourself with some of the various surfaces and finishes used in paper. Some may be familiar to you already. Others will be new.

- Antique Finish
- Cast-Coated Paper
- Cockle Finish
- Dull Finish
- Eggshell Finish
- English Finish
- Felt Finish
- Glazed Finish
- Granite Finish
- Laid Finish
- Linen Finish
- Machine Finish
- Machine Glazed
- Matte Finish
- Mottled Finish
- Natural Finish
- Onionskin Paper
- Parchment Paper

Design Concept & Texture

Varying paper surfaces can dramatically or subtly alter the mood you want your designs to convey. An exercise from *Using Design Basics To Get Creative Results* by Bryan L. Peterson uses the example of a piece of jewellery placed against two totally different surfaces — a shiny tile of black Formica vs. a piece of cement.

Translate this same concept to paper and imagine a photograph of a well-preserved vintage automobile printed on extremely smooth, glossy paper or printed on a rough, peppy surface. Neither one is necessarily better or worse. It depends on the mood you want to convey. Increased contrast between the image (and its visual texture) and the actual surface of the paper can create interest in your design.

When selecting paper, choose a texture that is related to the concept of your design and doesn't overwhelm or get in the way of the message. While you can make a bold statement with texture, sometimes a subtle texture

that stays 'in the background' is most appropriate. Make sure that your texture works with your choice of type and images so that text does not become unreadable or images unrecognizable.

It may be necessary to use a bolder typeface if your paper is rough or strongly patterned.

Here is an example of paper texture from an assignment.

Unexpected contrast: In a brochure promoting a computer-related service: "The grey colour also evokes a high-tech, sterile mood, although I might expect a glossier surface to go along with that, rather than the sensual feel of the textured stock." — Student ID S011203

My comments: "...the softer texture may indeed have been meant to soften and humanize the high-tech image."

Visual Textures

Everything around us has a texture. Sometimes we can simulate those textures with paper, but more often the textures we create in our designs are visual rather than tactile. However, those visual textures can be just as provocative or full of meaning as actual textures we can touch.

It's extremely easy to find or create visual textures for your designs. There are four basic ways to incorporate visual texture.

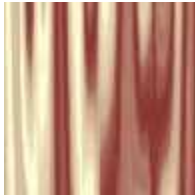
Objects within a photograph



Textures: fairly smooth surface of the chalk; rough surface of the cement



Textures: smooth glass bottles; fabric of the potholders



Textures: worn wooden mallet; grass



Images created with photo-editing software



These textures may mimic actual textures or be imagined textures

Texture: mimics drapes or folds in a satiny fabric



Texture: simulates a rough, rocky surface

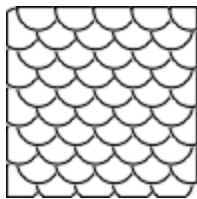


Texture: random soft circles create an imaginary texture

Digitized images of actual textures (from scans, digital photos)



Texture: a straw mat



Texture: piece of door mat made from old tires



Texture: tree bark

Colour

Value

Value is present in all design. It is the lightness or darkness of an object, regardless of colour. Value is relative to the background colour and other items on the page.

Use value to:

• Increase/Decrease Contrast

The greater the difference in value between an object and its background, the greater the contrast



Choose the value that creates the amount of contrast and effect that you want for your design. In the above examples, the lighter value recedes into the light background. The design with the greatest contrast makes the darker object more dominant.

• Create Movement

Objects of the same value create a static design with all objects equal in visual importance. Introducing varying values gives the page a more dynamic appearance and creates a 'pecking order' among the objects. Some stand out while others recede.



Mix elements of different values to add visual movement to your design or to create a hierarchy of importance.

• Lead the Eye

By creating a pattern of dark to light values, even when the objects are equal in shape and size, it leads the eye in the direction of dark to light.

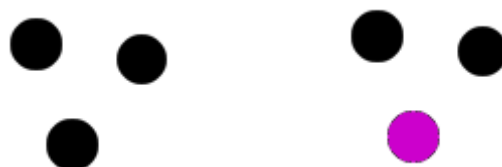


In the above example, the first set of all dark lines are static. The middle example leads the eye in a downward direction (dark to light).

Reversing the values of the lines leads the eye upward.

Use colour to change the effect of value:

Colour has the power to override the effects of value. In a high contrast black & white design, introducing a single, small bit of colour will change the focus and balance of the design.



The eye is drawn to that spot of colour even if other elements are designed to draw the eye in some other direction or the objects are otherwise equal.

That's the power of colour.

Layout : grids and columns

Grids

Most designers will set up a page grid before they start whacking elements down on a page. Of course, if you're using a computer, it's quite easy to stick stuff on a page and move it around in a fairly random fashion until you've got something you like the look of. Generally speaking, though, that approach is likely to result in some pretty awful pages and, over a lengthy document, may well result in a total hotchpotch which simply confuses the reader.

To determine the grid appropriate for your design is no easy business, but it's worth investing some time in it. Here are a few pointers you might find useful:

- **Number of lines per page** - it's normally helpful if the number of lines you can fit on each page in your chosen font is divisible by the number of grid sections you intend to have. It's well worth devoting some time to flowing some text ('printer's Latin' for example) on to a page and getting a printout in various column widths and different font sizes (if you're working in a college, it's worth asking whether they already have something of that sort). You can easily be surprised - for example:

This is 12pt face.

As you can easily see by comparing it with the text alongside both 10pt and 12pt have their baseline on a 12pt body.

This is 12pt face.

As you can easily see by comparing it with the text alongside both 10pt and 12pt have their baseline on a 12pt body.

- You can use the same exercise to work out how many words in a given font can be fitted into a column centimetre of a given column width.
- **Complexity of content** - if your content is to include relatively little artwork, few panels containing comments, quotations and so on, then you may not need a grid at all. If it is to be fairly complex, then it's a good idea to have a number of panels in your grid, even if your basic page is to be a single column of text.

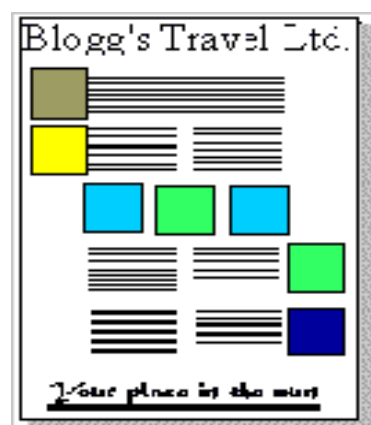
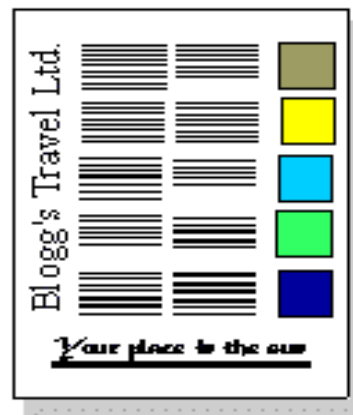
- **Margins** - a function of how much you need to fit on to each page, which of course will vary from one production to another, but the following general rules are often followed:
- **foredge** (also known as outside margin): should be an average of head (top margin) and foot (bottom margin)
- **foot** (also known as bottom margin): should always be bigger than the head (top margin), probably at least 50% bigger (this is due to the so-called optical centre - due to an optical illusion, we tend to see the centre of a page as being slightly higher than the actual centre. Thus, if elements are situated exactly equally on either side of the optical centre, we tend to see them as too low down. For that reason, when setting up a page, we normally set up the bottom margin around 50% bigger than the top margin)
- **back** (also known as inside or gutter margin): the two back margins taken together should be roughly as wide as the foredge (when setting up the back margin, you should bear in mind how your work is to be bound - some bindings 'eat up' a large amount of paper)

Master pages - most desktop publishing systems will provide you with master pages. It's on those pages that you should set up your grid once you've decided what it should be.

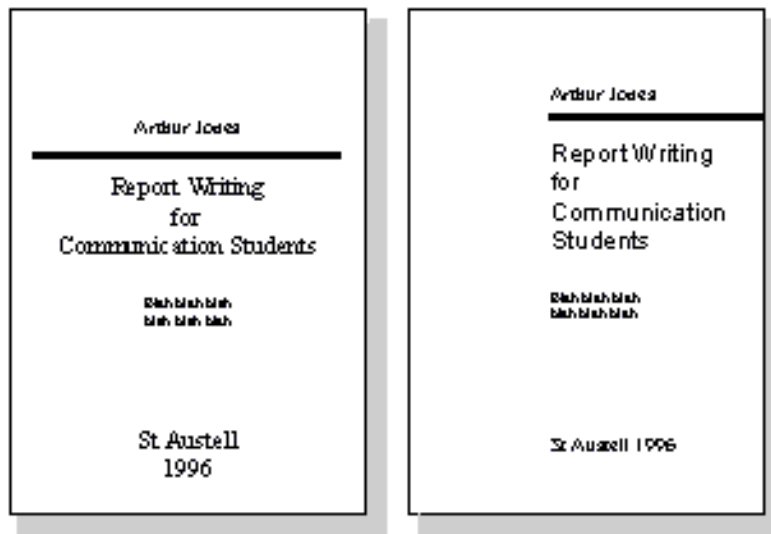
Symmetry versus Asymmetry

It's certainly a good idea to work to grids, but following them slavishly can result in pretty dull design. Similarly, It's not a bad idea to start off with an idea of a symmetrical design, but producing symmetrical pages all the time can end up boring.

You'll sometimes come across the CUTYOS rule for organizing elements on a page. Designs following those rules are produced in the shapes of those letters and look like this:

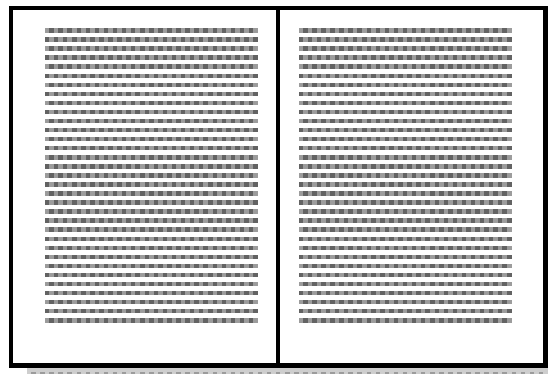


The CUTYOS standard layouts work well and are especially suitable for posters, but sticking rigidly to symmetry can produce rather characterless layout. Of the two report covers below, it seems to me that the asymmetrical layout of the report on the right has a lot more going for it:



So it's always worth experimenting with a less obvious design. Also, be wary of the automatic functions offered by word-processors and DTP software, they certainly have their uses, but they can end up leading you into rather unexciting designs.

Single column

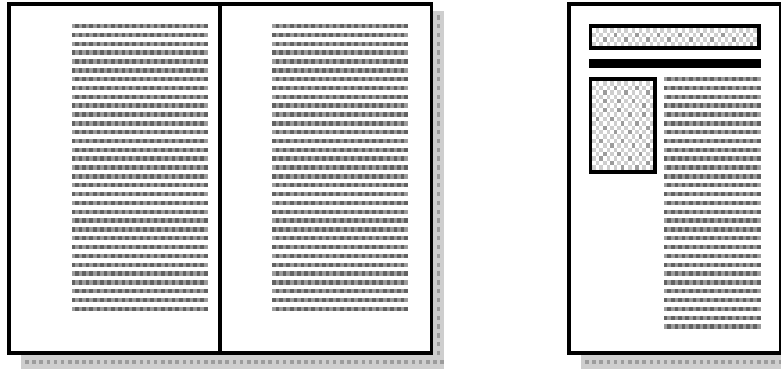


The big advantage of a single column is, of course, that it's easy to use - so easy in fact that you might as well just use a word-processor rather than a DTP system. It's also fine for large amounts of unbroken text and is therefore very economical.

Problems are that it's easy to end up with lines that are too long to be read comfortably (always avoid lines longer than 2.5 alphabets) and it's not easy to split this up comfortably with heads, subheads and illustrations.

Generally, it works best at, say, A5 size (148 x 210 mm) rather than A4 (210

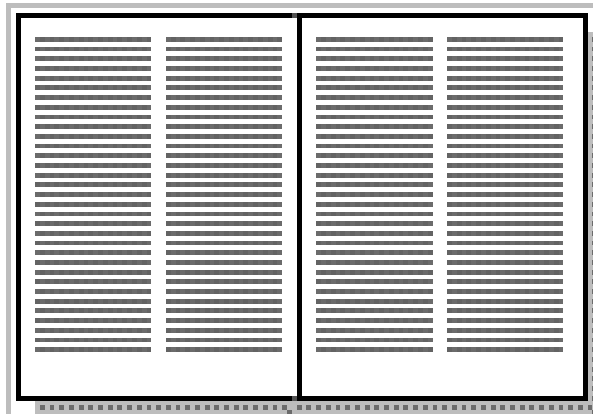
x 297mm).



While still keeping the economy and ease of development of a single column layout, you can make things livelier and more interesting by going for a single column which is a good deal narrower than the page.

You can use the very wide margin for heads and subheads, small illustrations, panels containing explanations or examples etc. and, with a little bit of imagination you can get something a bit more lively - the bottom example above, for example, is one of the standard templates that comes with the dtp software *Corel Ventura*.

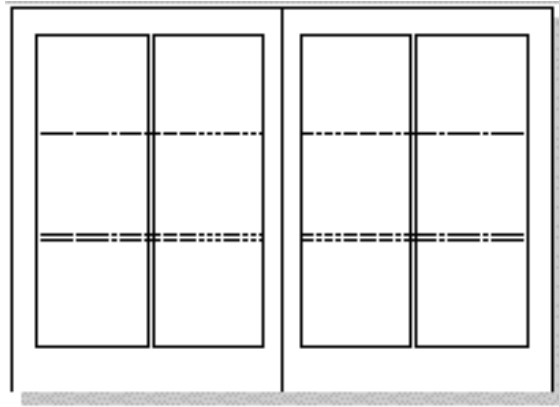
Two columns



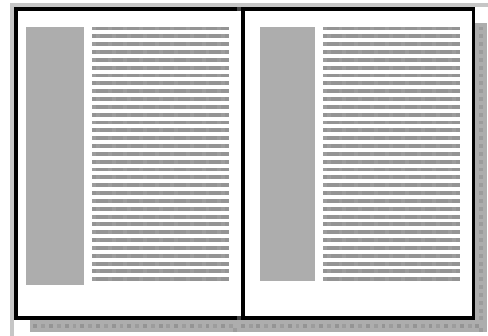
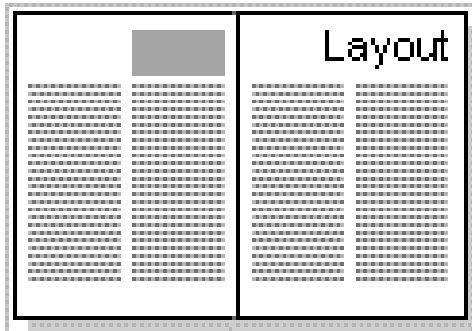
A two-column layout is often just as efficient as a single column layout. If you use just one column on a page, then its width is limited by the maximum length of a line to 2.5 alphabets. By using two, narrower, columns you can put more text on a page.

Like a single column, though, it can be limiting and doesn't normally allow

much scope for design, though grids



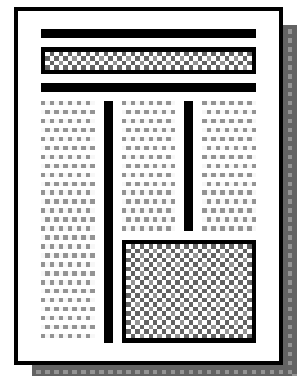
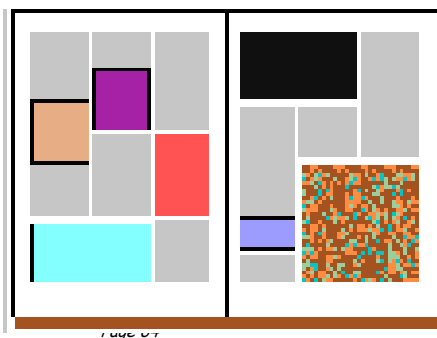
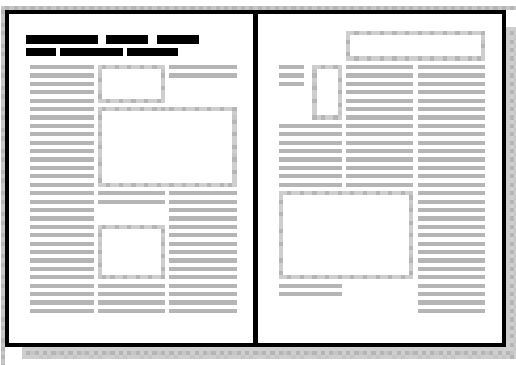
developing a lively like this will help:



You can add some interest to a two-column layout by reducing the height of the columns and reserving the space for headings graphics. It can look a bit odd, though, if there's nothing there, though you can militate against that by having a running head on every page.

You can also add interest by using two columns of differing widths. The problem is that this only really works if the two columns are somehow different in content, for example if the narrow column is providing a running commentary on the wider one.

Three columns

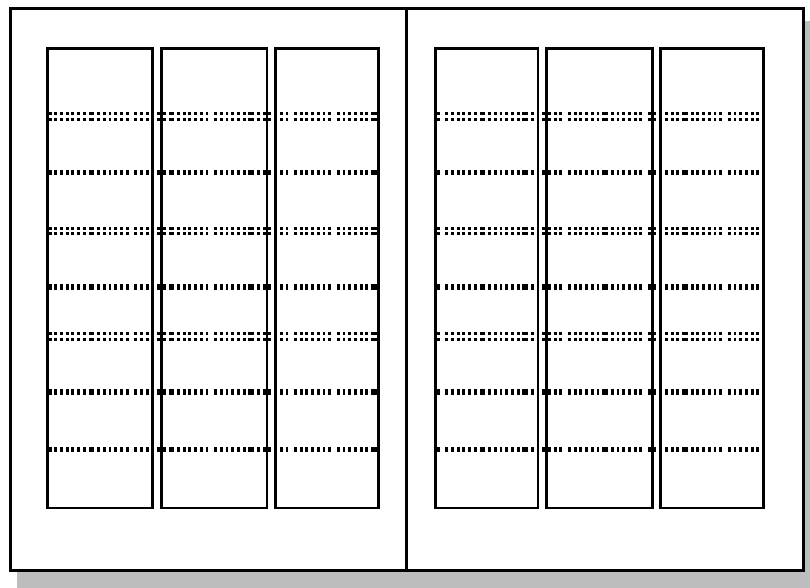


A three column page is excellent for the production of a lively, interesting layout. It is particularly useful where a lot of artwork has to be combined with text.

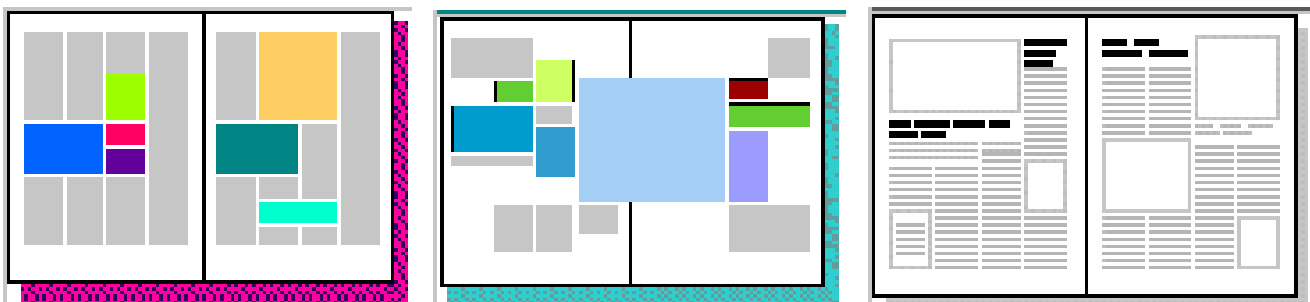
The relatively narrow columns will probably force you to use a fairly small font and layout can start to get confusing if you're not careful. The use of a fair amount of white space often helps to make the overall layout comprehensible.

Like the two-column layout, this one can quite usefully be mixed with headings spanning the whole page. For example, the bottom example above is one of the standard layouts offered by *Corel Ventura*.

This is a fairly typical grid you might use for three columns:

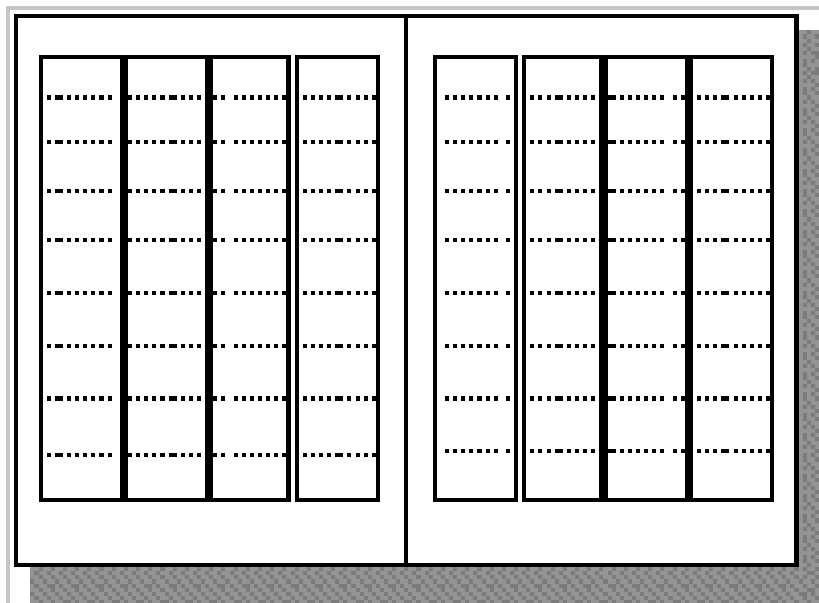


Four columns



A four column layout can readily be lively and interesting, but it can all too easily turn out to be hopelessly confusing. It works well with lists of things, so it could be good for, say, an index or an encyclopaedia.

Here's an example of a fairly typical grid:



The pages above are based on that grid. It can be difficult to use on A4 paper because the columns are getting so narrow that you'll have to use a fairly small font and you may well end up with quite a lot of hyphenation which will make reading difficult.

Nevertheless, if you have the patience to work with it, it can produce interesting designs, especially if, as with three columns, you're willing to use plenty of white space. It can also be readily combined with two-column layout, a combination which works quite well for magazines.

Grids 1: Order out of Chaos

What is a Grid and Why Do I Need One?

Think of the grid as a plan -- a plan for your page layout

Many of the pages that you see everyday have a grid. You may not see it but it is there, holding up the design, establishing structure, guiding the page elements.

A grid is an invisible structure used to guide the placement of elements on your page.

Grids don't appear on the printed piece but their influence may be evident in the widths of column texts, the uniformity of space around photographs, or the consistent placement of repeating elements from page to page in a magazine.

They are a series of guidelines that determine the margins of the piece, space between page elements (headlines, body text, photographs, etc.), and let you know where to put things on the blank page.

While it is invisible in the final printed piece, you'll need to be able to see it during page construction.

Before deciding when, why, and how to use a grid you need to know the elements of the grid and how to create it.

While it is invisible in the final printed piece, you'll need to be able to see it during page construction.

In your page layout, you've probably set margins. These margins often show up as light solid or dashed lines on the screen.

These top, bottom, left, and right margins create a box in the middle of your page. Stop there and you have a Page 57 single unit grid.

Further divide the page into uniform parts and you've created a multiple unit grid. You can create a visible grid to aid in page layout using the guidelines feature of your page layout software or by drawing lines or boxes that you place on a non-printing layer of your publication. Often you can "pull" a guideline from the rulers on the sides of page and place them where you want them.

Margins

Margins define the outside boundary of your page. They frame the content of your pages. Margins may not be equal all around (but are normally consistent from page to page or panel to panel). In most programs you would set the margins when you define the page dimensions (format). You can also adjust the margins "on the fly" by moving the guides on screen (in some programs).

Alleys

When you divide the interior space of your page into uniform parts the white space between units are alleys. Depending on how you've set up your grid the alleys may run horizontally, vertically, or both directions on your page. In some designs this would translate to the white space or "gutter" between columns of text.

Gutter

In a two page or two panel spread, the gutter is the inside margin. It's the space on either side of the fold. In some page layout programs the space between two columns of text is sometimes called the "gutter" as well.

Grid Units

Grid units are the primary locations on your page where you will place text and images. They determine **placement** not necessarily **size**. That is, if you have a graphic image that is larger than your grid unit, it doesn't mean you can't use it. You would use your grid units to help resize the photograph, ideally to fill 1, 2, 3 or more grid units and then to place that image on your page.

Grids 2: Consistency and Unity

How does a grid tie elements together?

For the most part, people prefer organized visual information.

Newsletters, magazines, brochures, annual reports, and books often have many visual elements: columns of text, headlines, photos, illustrations, pull-quotes, etc. Grids allow the designer to build page-to-page consistency into these documents.

Readers expect to find page numbers in the same location on each page.

When all the text in a given article -- even when it spans several pages -- has a consistent look, including column width, it enhances readability. Readers often expect to find sidebars, informational text, and other oft-repeated elements in the same place from page to page.

A grid, used consistently on all pages of a multi-page document, makes it easier for the designer to provide the consistent look that readers often expect.

A carefully conceived grid system also allows the designer to introduce variations without forsaking readability or consistency. It also speeds layout because it takes the guesswork and "look back to see what we did before" out of where to place elements from one page to the next.

The following pages are examples of how you might combine text and graphics in a 7-unit vertical grid (such as for a newsletter). Notice how page 1 (Figure 1) and 2 have a consistent (reversed) layout. Text columns are two-grid units wide. One grid unit provides an extra wide column of space separating the main text from the sidebar elements. Page 3 (right hand page of the 2 page spread, Figure 2) is quite different from the first two pages but if you look at the underlying grid structure (Figure 3) you'll see that all three pages use the same grid system.



FIGURE 1: left-hand page of newsletter with 7-unit vertical grid



FIGURE 2: two page spread of newsletter with 7-unit vertical grid

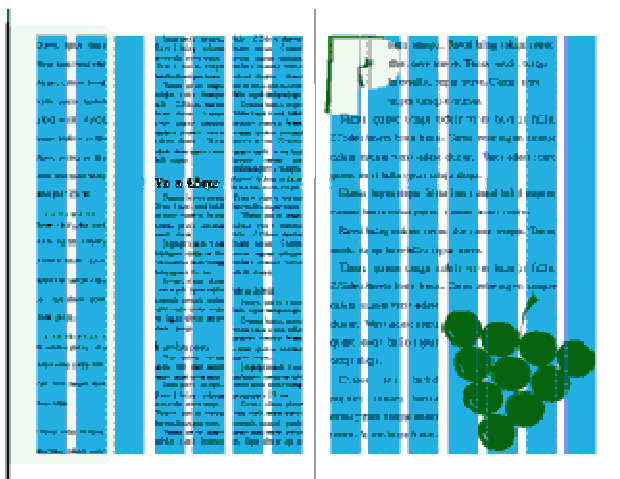


FIGURE 3: two page spread showing the underlying 7-unit vertical grid (blue)

Grids can unify a series of dissimilar documents

There are many ways to establish visual unity throughout a series of related pieces. You probably use your logo on all your marketing pieces. You may have colour-coded brochures for different aspects of your business. Grids are another way to bring unity and cohesiveness to a collection of brochures, sales sheets, display ads, spec sheets, and other elements of your marketing arsenal.

In a series of single, but related pieces (such as a series of posters or information sheets for a single ad campaign or single product line) a common grid can help unify the separate pieces. Let your grid help you place repeating elements in the same place from piece to piece. Let your grid provide a consistent guide for mixing graphics and text.

The informational sheets in Figure 4 have a common style for the headline treatments but don't all use the same number or size of graphics. The 3 unit grid (Figure 5) helps to unify these pieces. This is a fairly simple, straightforward example.



FIGURE 4: 3 informational sheets that share a common 3 unit grid



FIGURE 5: A three-unit grid helps unify a series of information sheets containing varied elements.

One grid, many designs

Grids have been accused of creating boring, static designs. It's not the fault of the grid. Used properly, grids can offer a variety of creative design options. Figure 6, below, shows how a 4x4 (16 unit) grid system takes on different lives using the same four graphic images and varying amounts of text.

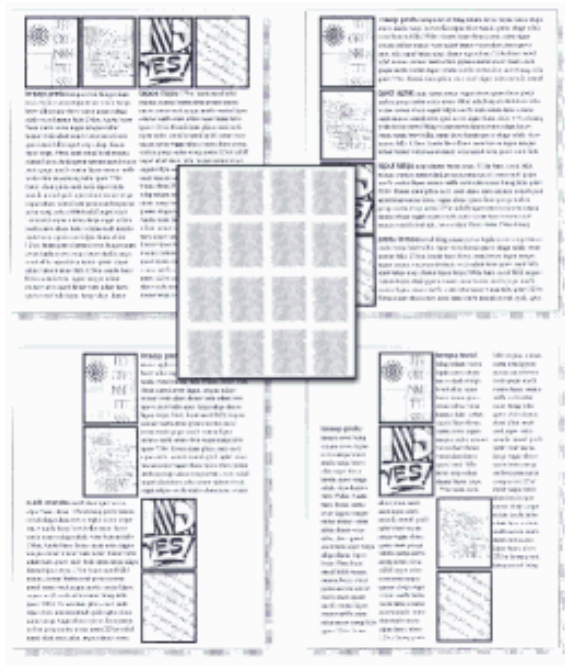


FIGURE 6: Just a few of the arrangement options using the same "boring" grid.

Grids 3: Flexible Options

Are grids too rigid?

Choose a grid based on the content and adjust content based on the grid

The right grid offers the designer flexibility without overwhelming them with possibilities. The right grid also enhances organization and makes it easy for the viewer or reader to understand the content.

There are no right or wrong grids, simply grids that are more suitable for different content and design objectives. Of course that doesn't help you much when you're staring at a blank page and a deadline. Here are some "thinking points" to help you plan your grid and your design.

- **Content or Page Elements.**

Is the publication heavy on text or heavy on graphics? Will there be many headlines, rules, illustrations, pull-quotes?

- **Text.**

Look at both amount of text and how it is broken down -- long articles, lots of short articles, a mix of long and short articles. How many subheads? Will you use eyebrows, decks, initial caps, and other visual cues?

- **Photos and Illustrations.**

Are there similarities in the type of illustrations or size of photos? Can photos be grouped by size or type? Are there a lot of rectangular elements or many irregularly shaped elements?

- **Complexity.**

Generally the larger the number of grid units (and the smaller the individual units) the more design options are available. However, too many options can destroy the underlying unity that the grid provides.

So, which grid is best? Here are some guidelines (remember, I said *guidelines* not rules).

- Lots of text with few graphics -- such as a book with long chapters and few or no illustrations -- can use a simpler grid. 1 - 3 units, perhaps.
- A newsletter, brochure, or magazine with many photographs usually requires a grid with many smaller units to give more possibilities for placing and sizing the photographs.
- Newsletters, because they generally have more text, often use a columnar grid.
- 1, 2, and 3 column grids are common. Each can accommodate lots of text, especially long articles.
- 4 or more columns offer greater flexibility for publications with text, photos, and other graphic elements and a mix of long and short articles.
- Grids based on an even number of grid columns can suffer from too much symmetry if text and graphics are confined to individual or double grid columns throughout.
- Newsletters don't have to be tied to columnar grids. A newsletter consisting of mostly small articles or "news briefs" and photos could use a 6(2x3), 9(3x3), or 12(3x4) unit grid of rectangular or square units quite nicely.

Grids don't have to limit design

Grids *can* feel stifling. But they needn't be.

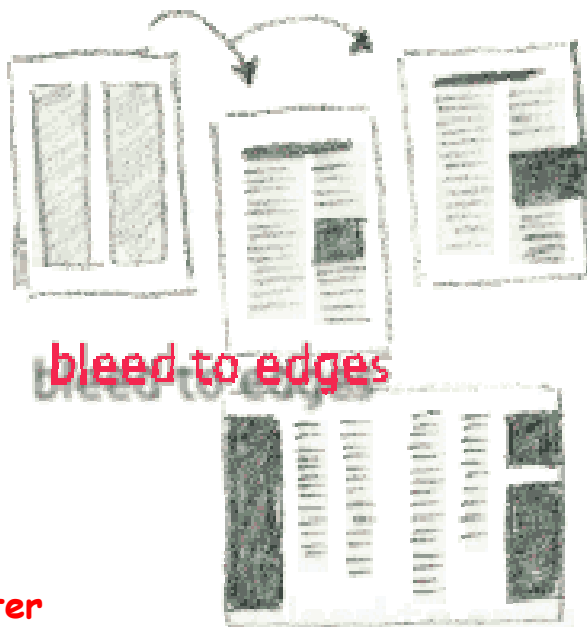
1. Layouts based on grids are not appropriate in all cases.
2. Grids should fit the mix of elements rather than forcing elements to fit the grid.



Elements on your page do not have to be confined to individual grid units. In a five-column grid, 5 narrow columns of text can be hard to read. Try two columns of text, each spanning two grid units with an empty grid unit for accents, photos, breathing room, or adjacent caps.

Resize photos to fill 2-3 or more grid units. You don't have to always fill the entire grid unit either. Fill 2 1/2 grid units with a photo, leaving some extra white space.

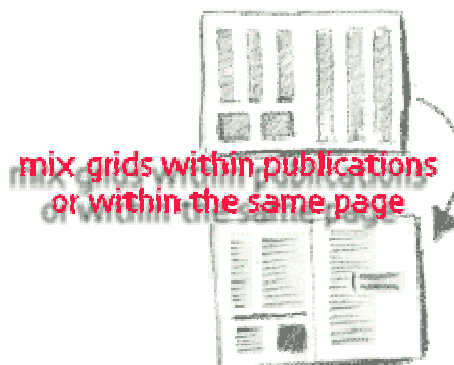
Gutters and margins are not off-limits. Bleed photos off the edge of the page. You don't have to fill every little grid unit. The odd column in a 5 or 7 column newsletter grid can offer extra "thumb space" along the outer edges. There are many ways to add white space to your designs -- leaving some grid units open is one way.



If one grid is good, two could be better

Some publications use mixed grids. A different grid than what is used through much of the publication might be appropriate to present content that varies greatly from the rest of the pages. It is also okay to mix grid systems within the same page.

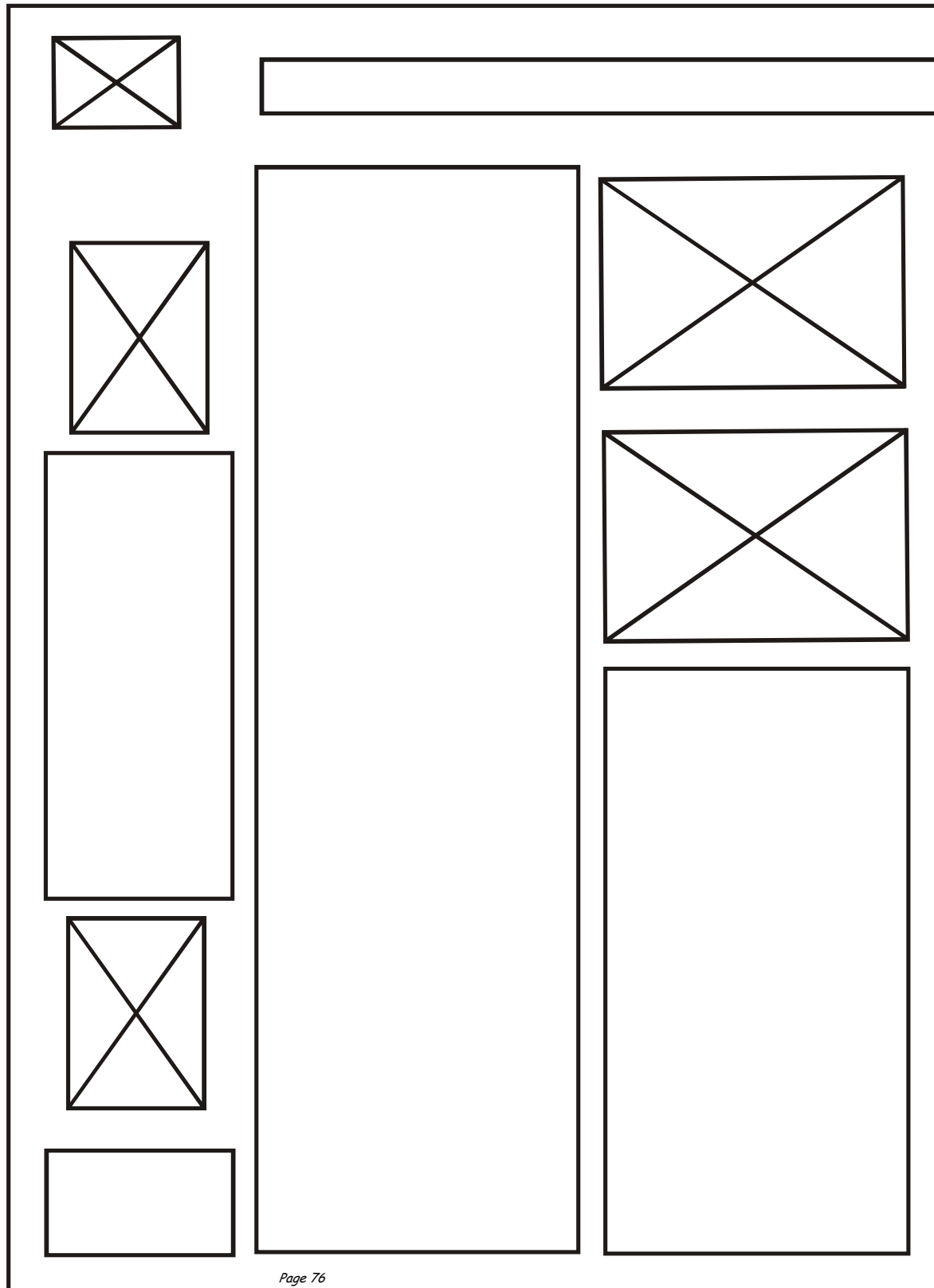
- A text heavy newsletter might group all photos and illustrations on a single page. The text pages can use a simple grid. The multiple photos might require a more complex arrangement.
- Use two different grids to differentiate sidebar or secondary items from primary articles.
- Mix long and short articles in the same publication using a different grid for each. Or use different grids for feature material and regular recurring departments.



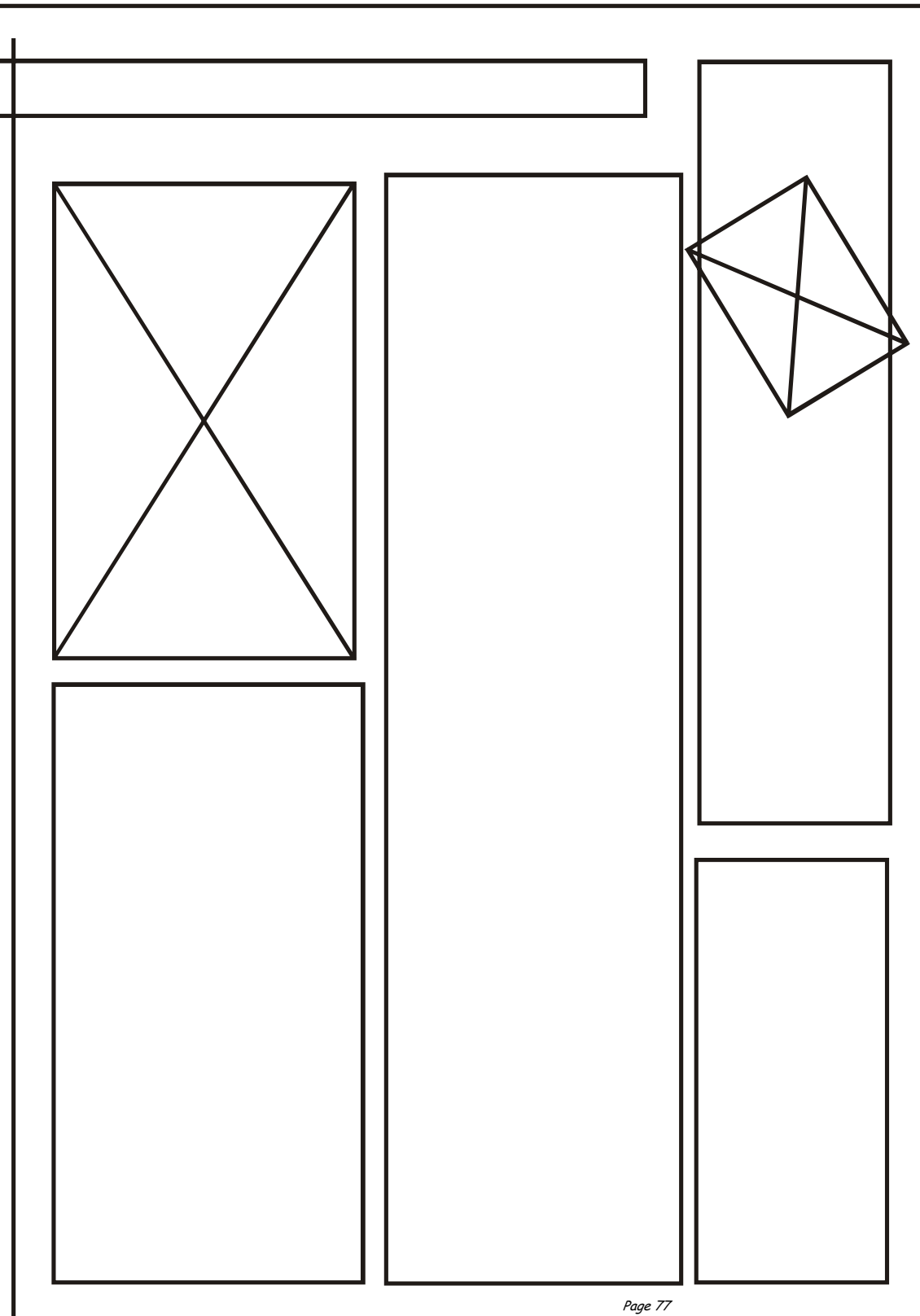
As with any grid system, use it consistently. Let content guide your design and make your grid a partner in your page layout -- not a dictator.

Thumbnails and Roughs

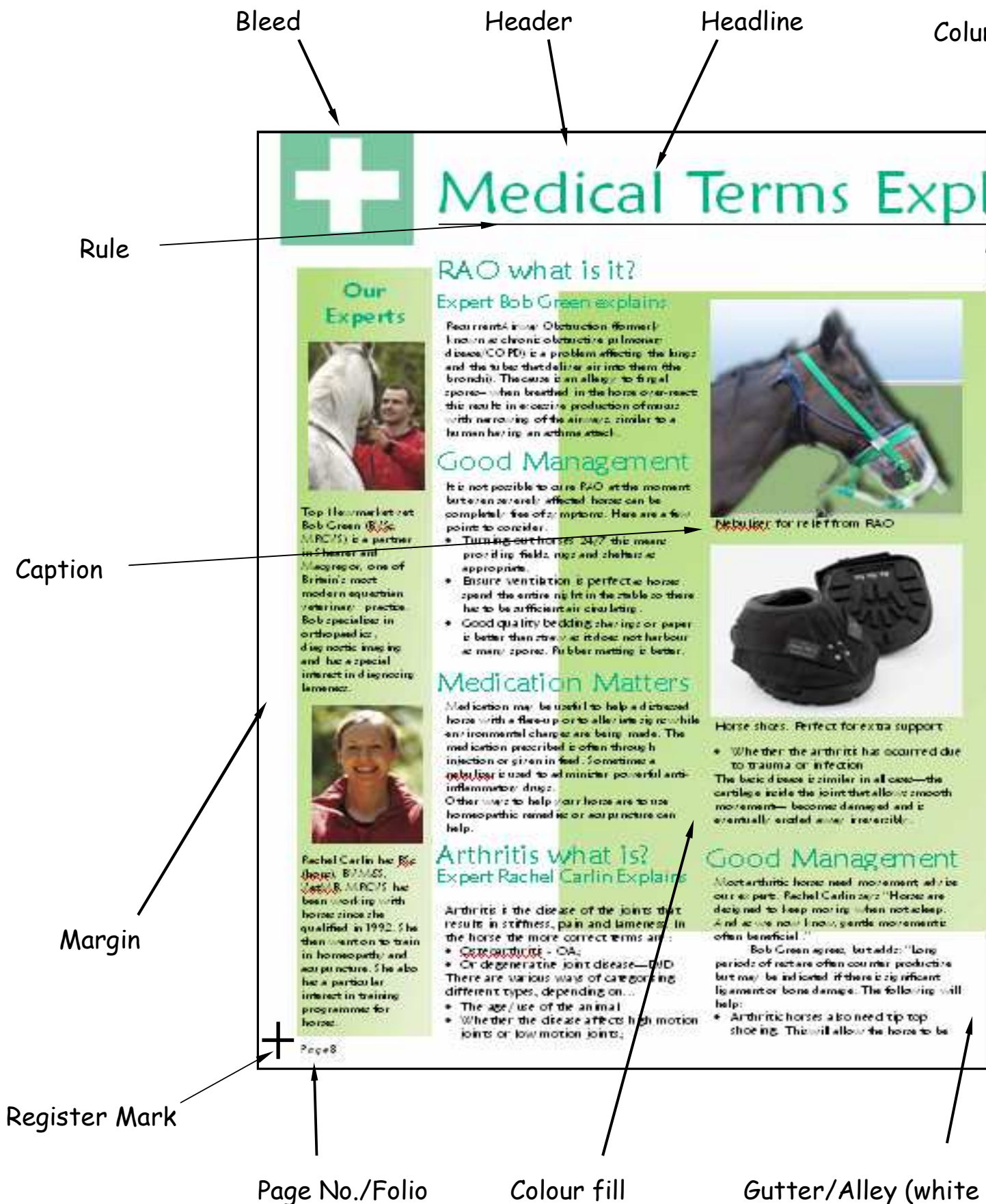
Before a magazine can be produced a detailed layout of the proposed design must first be roughed out using thumbnails as shown below. The example shown uses a three column format.



The solution to the example below can be seen overleaf.



Typical magazine page layout



Column Rule (black line)

Heading

Maintained By Experts

Text

Azoturia what is it?

Most commonly known as "set feet" and "tying up" - the correct name for this condition is exertional rhabdomyolysis. This condition is associated with exercise. Exercise in the muscle cells ruptures, spilling contents into the bloodstream resulting in pain, stiffness and lameness. If there is a large number of these enzymes within a blood sample, then muscle damage has occurred. This is most common in young fillies, but can affect any age, type or breed.

Good Management

A veterinary diagnosis is important to determine the most appropriate care and treatment. There are variations of the cause, and severity, of the disease which means treatment may well be different for each horse. Always feed a diet that is on a par with the amount of exercise that the horse is receiving. Most importantly always ensure your horse is sound and healthy before you exercise him. Respiratory and orthopaedic injuries make horses much more susceptible to exertion.

Medication

"High-strung" horses also appear to be predisposed to tying up. In these cases judicious use of ligandolazine can be useful especially when the horse may be fresh and excitable. Homeopathic methods are also available. The basic medical advice is to treat your horse with a specific diet. High carbohydrate diets can encourage exertion, changing to that of fibre and vegetable oil enriched feed. Supplementing electrolytes into the diet and will increase levels of sodium as a horse can consume up to 10 litres in an hour being 4g of sodium in every litre.

Exercise

Whilst the condition is triggered by exercise, controlled exertion is central to successful management. Detailed exercise plans will vary depending on the use of the horse and the number of episodes of exertion it has suffered. Consistency counts. It is reassuring about the future for horses prone to the condition. Consistency is what counts here. If you've got the feet right for the turnout right and the exercise regime right then you can do what you like with a horse prone to tying up.



Magnetic boots for arthritis

- Examining old shoes for wear. If one side is more worn than the other then this is how the horse should be shod.
- Turn out—with care. The horse will benefit from plenty of turn out, but must be kept warm and dry.
- Magnetic therapy products can be useful. Blankets are good especially for sore backs.

Medical Matters

Injecting anti-inflammatory drugs directly into the affected joint is a common procedure. This also means that the horse can remain active. Homeopathic methods can also be considered and if organic. Therapies such as acupuncture and physiotherapy are also considered a good form of management. But the cheapest, simplest and most effective way is painkillers and often do good jobs.

Tilly's Top Tips!



- Always ensure your horse bedding is clean and dry.
- If your horse has an outdoor paddock make sure it has a shelter.
- A few hardy with your horse clean and brush him to prevent mud fever (an infection of the lower limb).
- Encouraging your horse to eat from the ground will allow the respiratory system.
- Always ensure your horse is fed the correct diet.

Useful Contacts

- Fobb and Sbee Veterinary Clinic
01693 355239
- Top Spec
0870 240 6596
www.topspec.co.uk
- Trinity consultants
01243 556493
www.trinityequi.com

Page 9

Reverse (Text)

Tilt

Margin

space)

Sub Heading

Footer

The Big Picture

Defining Principles of Design

Generally, all the principles of design apply to any piece you may create. How you apply those principles determines how effective your design is in conveying the desired message and how attractive it appears. There is seldom only one correct way to apply each principle.

Balance

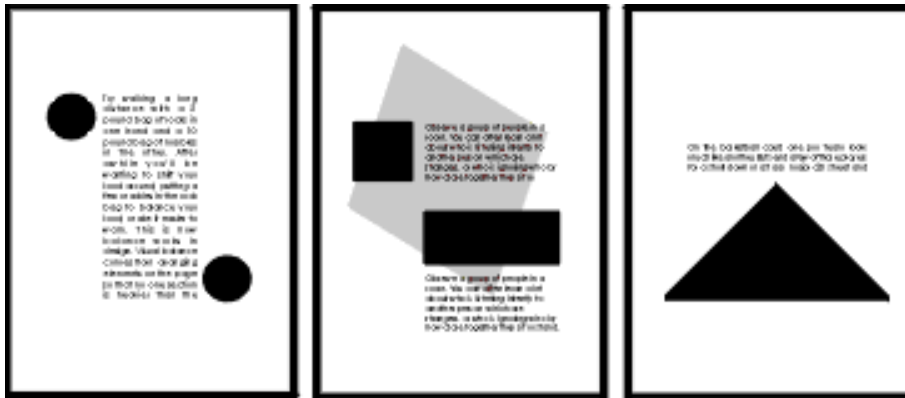
Try walking a long distance with a 2 kilo bag of rocks in one hand and a 10 kilo bag of marbles in the other. After awhile you'll be wanting to shift your load around, putting a few marbles in the rock bag to balance your load, make it easier to walk. This is how balance works in design. Visual balance comes from arranging elements on the page so that no one section is heavier than the other. Or, a designer may intentionally throw elements out of balance to create tension or a certain mood.

Proximity/Unity

Observe a group of people in a room. You can often learn a lot about who is listening intently to another person, which are strangers, or who is ignoring who by how close together they sit or stand. In design, proximity or closeness creates a bond between people and between elements on a page. How close together or far apart elements are placed suggests a relationship (or lack of) between otherwise disparate parts. Unity is also achieved by using a third element to connect distant parts.

Alignment

Can you imagine how difficult it would be to find your car in a crowded parking lot if everyone ignored the parking lot stripes and parked in every which direction and angle? Imagine trying to get out of there! Alignment brings order to chaos, in a parking lot and on a piece of paper. How you align type and graphics on a page and in relation to each other can make your layout easier or more difficult to read, foster familiarity, or bring excitement to a stale design.



Repetition/Consistency

What if Stop signs came in pink squares, yellow circles, or green triangles, depending on the changing whims of a town and a few of its residents? Imagine the ensuing traffic jams and accidents. Repeating design elements and consistent use of type and graphics styles within a document shows a reader where to go and helps them navigate your designs and layouts safely.

Contrast

On the basketball court, one pro team looks much like another. But send a few of those players for a stroll down most any major city street and something becomes apparent — those players are much taller than your average guy on the street. That's contrast. In design, big and small elements, black and white text, squares and circles, can all create contrast in design.

White Space

Did you ever participate in that crazy pastime of Fiat Panda stuffing? Were you ever the guy on the bottom struggling for a breath of fresh air or the last one in trying to find a place to stick your left elbow so the door will close? It wasn't comfortable, was it? Imagine trying to drive the car under those conditions. Designs that try to cram too much text and graphics onto the page are uncomfortable and may be impossible to read. White space gives your design breathing room.

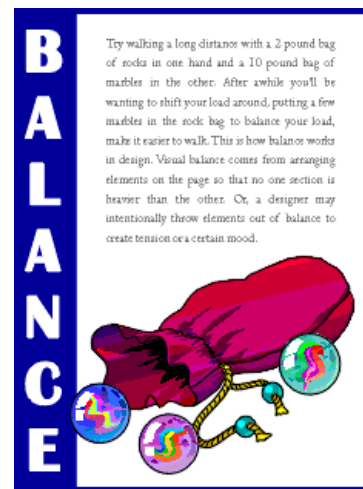
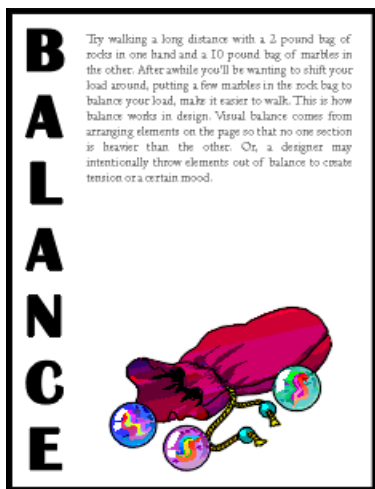
The Big Picture

Illustrating Principles of Design

The examples you'll find here demonstrate varying degrees of each of the six principles of design in a before and after format. View them individually and as a whole to see how different principles are applied. How might you do any of these differently?

Note: The text, not always readable in the examples, is the same as the definitions in Lesson 1.

You can create balance with the three elements (text block, graphic, vertical text) here but in the first example they appear to be just random elements with no **unity** or **balance**. In the second "Balance" example the text block and graphic are resized to bring them closer together and better balance each other.

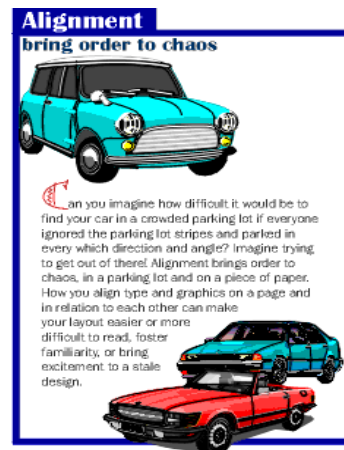


To tie the elements together, move them closer together (resizing helps accomplish this). Notice that the graphic (one of the marbles) slightly overlaps the box enclosing the vertical text, **unifying** the two elements. Reversing the word "balance" out of the blue box also adds more **contrast** to the composition. The increased leading in the text block redistributes the **white space** in a more balanced manner.

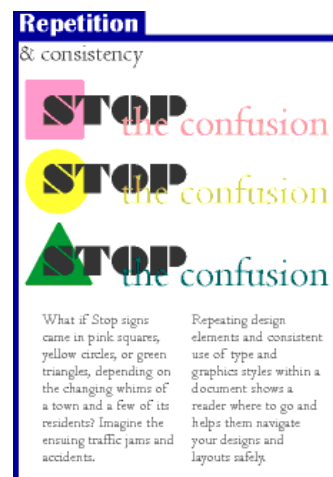
The graphic anchors the bottom of the page, but the four text elements all float on the page with no apparent connection to each other (**proximity/unity**). The change in the headline (font change, reversed out of blue box) along with the subheading pulled in closer provides **balance** with the graphic on the bottom. The spacing between the two paragraphs of text is reduced slightly as well.

There is nothing inherently wrong with centred headlines, text, and graphics. They lend a formal tone to a layout. But, for this series of layouts something a bit more informal is called for. Also, large blocks of centred text are usually harder to read.

In the second "Alignment" example below, text **alignment** is left-aligned, ragged right, wrapped around the bottom graphic which is aligned more to the right, opposite an added graphic that is aligned to the right to help **balance** the overall design.

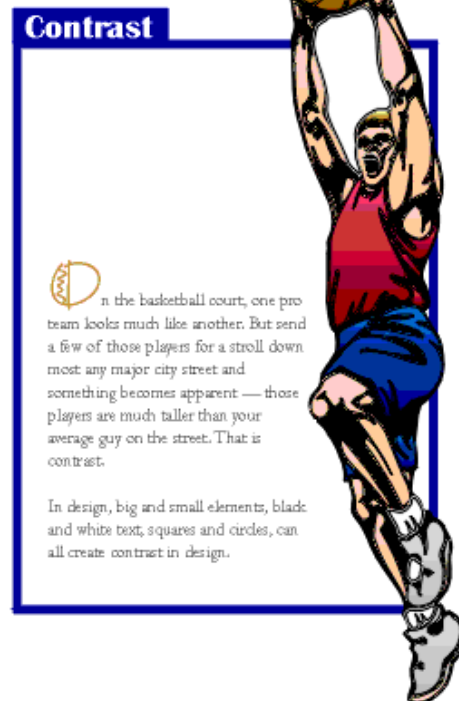
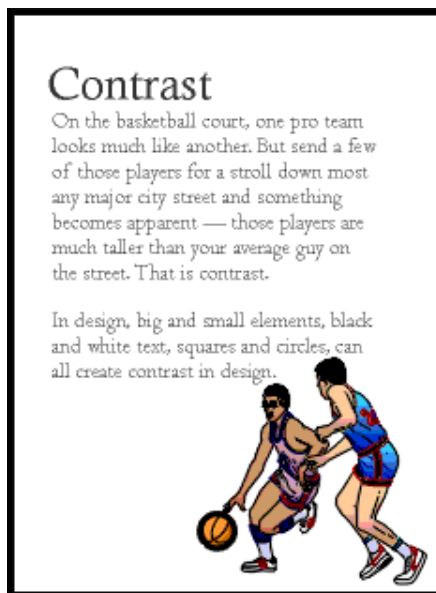


Within the second "Repetition" example, the headline is repeated three times using graphics that tie in with the copy in the text blocks. The **repetition** of the colours in the shapes and headline text that are in the copy help to reinforce the theme. Overlapping the graphic and text elements **unifies** the elements of the design.



Another aspect of **consistency** that can be seen when viewing all 6 of the "after" examples is the blue borders, blue reversed boxes, and the typeface (Britannic Bold) used for the names of all the principles of design. The drop cap used in three examples (Bermuda LP Squiggle) is another element of **consistency**.

In the first example there isn't enough **contrast** between the headline and text due in part to size but also because the two different serif faces used are too similar (not obvious from the small graphic, trust me, they are different typefaces).



That oversized graphic provides real **contrast** and reinforces the copy (tall basketball players). Dropping the text down to the bottom portion of the page also reinforces the 'towering' aspect of the graphic. The reversed text in the blue box, the blue border, and the drop cap carries through the overall unifying elements found throughout the series. Additionally, the round shape of the drop cap and its colour echo the shape and colour of the basketball in the graphic. The drop cap and the reversed text on the left side plus the left-aligned text help to **balance** the large graphic element.

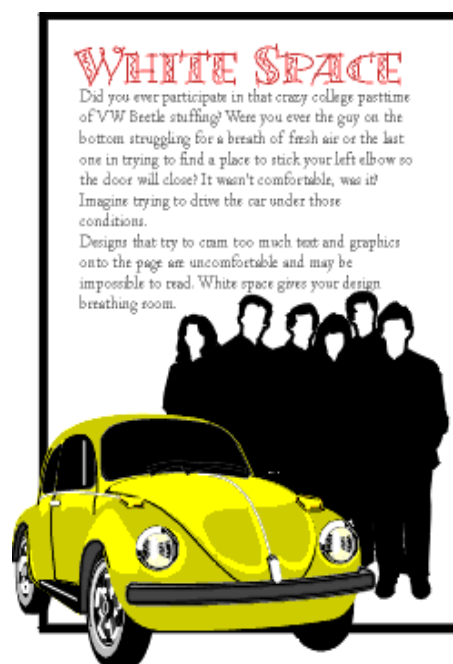
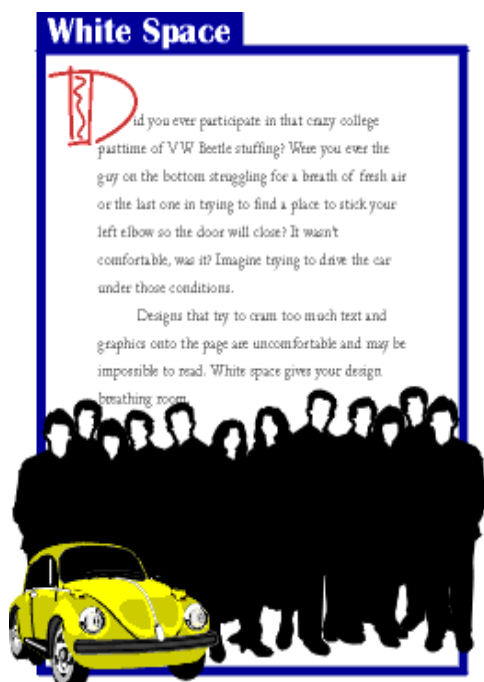
White space doesn't have to be white. The large block of black created by the graphic of people adds a large block of black **white space**. Multiplying the number of people and reducing the size of the car in the second "White Space" example provides additional **contrast** and reinforces the theme of the copy.

Additional leading, larger margins, deeper paragraph indents all add white space or breathing room to the design.

The oversized drop cap is another element of **contrast** and also helps to **balance** the page with the large, dark elements at the bottom of the page. The drop cap style, reversed title, and blue box are consistent with the rest of the series.

In the next series of lessons we will look at each principle of design in more detail and explore ways to incorporate each into your designs. We'll also touch on the ways that your software can simplify some related tasks, such as using style sheets to aid repetition and consistency or using leading and other spacing features to improve proximity, unity, and distribution of white space.

Typography & Page Layout



Typography & Page Layout

Type Terms

A typeface may be named for its original designer (Baskerville, Bodoni, Garamond, Goudy); for its use (Times Roman was designed for the *London Times*; Century and Avant Garde were designed for *Century* and *Avant Garde* magazines); for its characteristics (Excelsior and Paragon were designed for high legibility); or for its designer's fancy (Perpetua, Souvenir, Centaur). Typefaces are also given generic names as well as brand names, e.g. different type-founder's call Times Roman different names, e.g. Times New Roman, Geneva, and English.

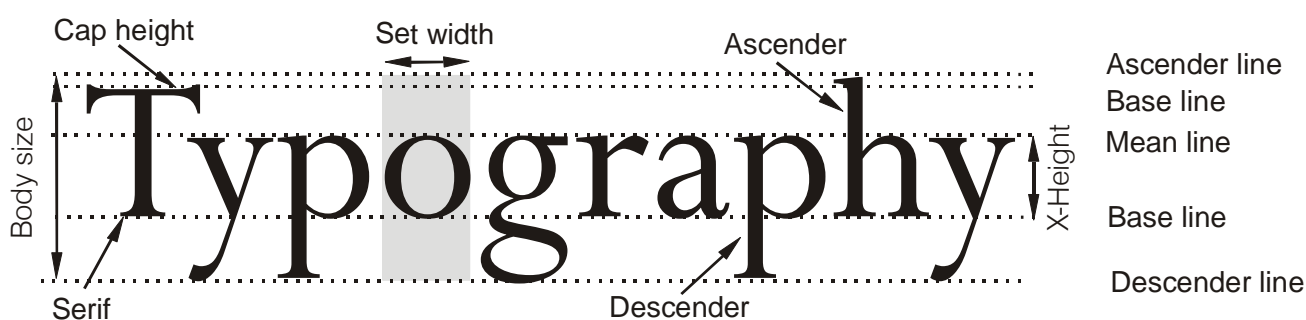
Typefounders' versions of the same typeface differ only slightly from each other. Even so you can, for example, seldom interchange one typefounder's 10-pt Baskerville with another's, to try to do so would result in a noticeable mis-match with the original setting.

To identify type or recognise a wrong font, you must know what the variables are, because differences amongst the thousands of typefaces available today can be minute. Since an untrained eye cannot distinguish even gross differences, you should become familiar with the fundamental features of type that are labelled in the following diagram:

Serif and Sans Serif

Serif fonts tend to create a formal, serious look. The serif is a decorative feature at the ends of letters, numbers, etc.

Sans Serif fonts lack the decorative features and are generally bland in appearance. The text used in this booklet is Comic Sans which is a Sans Serif font.



Basic anatomy of type

- ***x-height*** The height of the lower case letters such as `x', `a', `e'.
- ***Ascender*** The stroke of a letter which rises above the Mean line as `k', `l', `h'.
- ***Descender*** The stroke of a letter which hangs below the Base line such as `p', `y', `g'.
- ***Mean line*** The imaginary line which determines the height of lowercase letters; ascenders rise above the mean line.
- ***Base line*** The imaginary line on which all characters rest; descenders hang below the base line.
- ***Body size*** Size of the type being used; measured from the end of the ascender to the end of the descender.
- ***Serif*** Small strokes and cross-lines at the ends of major lines.
- ***Set width*** Width, in units, allowed for each letter which varies between letters and typefaces.
- ***Cap Line*** The height of capital letters. Depending on type design, capitals may be taller/shorter or same height as ascenders.

Type Categories

All typefaces that are to be used in the appropriate print media must be purchased under a number of specific criteria. It is important to know whether a favoured type design has the necessary flexibility to be used for a wide range of design and publication needs.

To this end, you must be aware that not all typefaces that are used have the same number of variations, or for that matter are available on the output device that you wish to use.

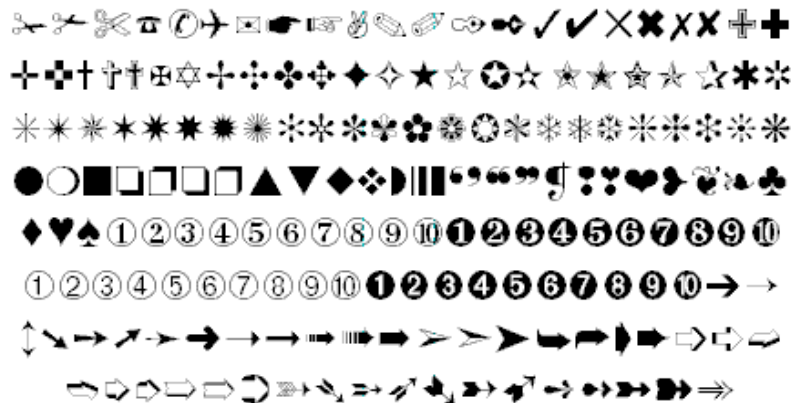
Font

Many of the more popular typefaces used today are available in three different alternatives: *Commercial font*, *Expert font* and *Pi font*.

A *Commercial* type font contains the usual range of characters that are needed for most forms of typesetting, i.e. one complete assortment of alphabet letters comprised of capitals and lower case, numerals, punctuation, special characters, and symbols.

A type font is only available in one specific typeface design. Therefore, a typeface such as 10-pt Times Roman is considered to be *one* font and 10-pt Times Bold is *another*.

Pi fonts usually contain a collection of special characters such as mathematical, monetary or decorative symbols, etc.



Pi Font — Zapf Dingbats

If you have a special need for certain characters, most manufacturers will make a pi font to fit your need using standard characters or even develop new one to suit you. *Symbol*, *Carta*, and *Zapf Dingbats* are examples of common pi fonts.

Series

Irrespective of the style of font you use, if the design is readily available in a range of sizes, e.g. 10-, 12-, 14-, 18-pt, etc. and has the same name, then it is regarded as being a *series*.

The actual range of sizes available in a font is dependent upon a number of interdependent factors such as:

- Application software, e.g. QuarkXPress vs Microsoft Word vs Freehand.
- Utility software, e.g. Adobe Type Manager.
- Font format, e.g. Type 1, Type 3, TrueType.

The type of output device being used, e.g. a *PostScript* laser printer has an infinitely larger series for its fonts than does a *non-PostScript* laser printer.

Even today, there are still a remaining few dedicated typesetting systems still in use that are restricted to size increments of 1-pt and also, cannot set type above 36pt.

Point Size

In the Technical Department we continually tell you that everything we measure is in millimetres, this true for everything except typeface.

Typeface is measured in **Points**.

Typeface is not normally presented smaller than **8 point**.

The size of text usually used by newspapers, books, magazines, etc. is between 10 and 14 point. The size of point being used here is 12 point. Headline text is generally sized at 16-36 point, anything over this size is usually found on posters etc. The heading at the top of this page is 18 point.

The text printed below is a typical page from a typeface catalogue. This unusual sentence contains all the letters of the alphabet. The typeface used here is **Times New Roman**.

12 the quick brown fox jumps over the lazy dog. 1234567890

18 the quick brown fox jumps over the lazy dog 1234

24 the quick brown fox jumps over the lazy

36 the quick brown fox jumps
over

48 the quick brown fox

Family

The last variable in the flexibility (and popularity) of a typeface design is whether or not the design has a range of variants. If a number of fonts have the same name and general characteristics of face, e.g. Times Roman, Times Bold, Times Roman Italic, etc. then they are known as a *Family*.

Helvetica
Helvetica Italic
Helvetica Bold
Helvetica Bold Italic
Helvetica Narrow
Helvetica Narrow Italic
Helvetica Narrow Bold
Helvetica Narrow Bold Italic
Helvetica Black
Helvetica Black Italic

Font Family

The majority of fonts in common use have at least four variants, i.e. normal, italic, bold, and bold italic. The popular type design used above (Helvetica), has a family of over 50 variants, whereas many decorative and script style fonts such as Algerian, Arnold Boecklin Giddyup and Pepita, do not have a range of different variations and are usually restricted to a single font. When nominating a typeface, the order of description can be thus:

- Type Size: **10 point**
- Type Body: **12 point**
- Type Family: **Helvetica**
- Type Weight: **Bold**
- Type Width: **Extended**
- Type Modification: **Outline**

Typesetting

J u s t i f i c a t i o n

Typing or setting text lines to the same length so that they line up on the left *and* the right is known as 'justification'. The information that you are now reading have been typeset using this method. The practice originated with Mediaeval scribes who ruled margins and text lines so as to speed writing and fit as many characters on a line as possible.

Later, metal type required even copy blocks to allow 'lock up' into page form. The opposite of justified text is ragged text.

Justification is accomplished by filling a line until the last possible word or syllable fits and then dividing the remaining space by the number of word spaces. The result is placed at each word space.

Word spaces are variable in width, expanding or contracting as needed to space the line out to its justification width.

Margins are the imaginary vertical demarcations for text or tabular columns. Overall or primary margins are established by the line length function or the cumulative total of secondary margins (tab or text columns).

Space between lines

To improve the ease with which text can be read, i.e., legibility, the amount of extra space placed between each line in a setting must be varied according to the line length and character of the type face being used. For example, a light type with a small x-height, or a medium type with a large x-height, would need to be treated quite differently.

Character in types has to do with the impression made by the individual forms, their proportions, and the intangible something in them that makes the letters of each word hang together to form an agreeable whole;

9 on 9 point Palatino

Character in types has to do with the impression made by the individual forms, their proportions, and the intangible something in them that makes the letters of each word hang together to form an agreeable whole;

9 on 10 point Palatino

Character in types has to do with the impression made by the individual forms, their proportions, and the intangible something in them that makes the letters of each word hang together to form an agreeable whole;

9 on 12 point Palatino

A suggestion in this matter is to have space equal to the depth of the lower case 't' between the lines. Most settings will always benefit with the addition of extra line space. A good rule-of-thumb is to add an extra 20% line space to the type face size being used.

Generally, the longer the line, the more space that is required. This is certainly the case when deciding the line spacing of sans serif type faces and for paragraphs set in a bold face. Capitals need more space between lines than lower case. The x-height, type face, weight, and leading make the type easy or very hard to read; consequently, decisions regarding type face and line spacing are very important in all forms of printing.

Space between words

To further improve on legibility, word spacing can also be controlled, but again too much or too little space can affect the ease with which the paragraph can be read. As you might expect, word spacing is affected by the style of type face chosen together with the particular situation for its use. Condensed type faces do not require as much space as expanded faces, and small type sizes read better with a little extra word spacing. As a general guide, the ideal word space represents the width of the lower case 'e' in the type face being used.

Word spacing must be controlled to ensure that there is neither too much, nor too little space. One result of bad word spacing is that the reader will quickly become tired and disinterested in the content and will find it difficult to concentrate.

Too little word space

Word spacing must be controlled to ensure that there is neither too much, nor too little space. One result of bad word spacing is that the reader will quickly become tired and disinterested in the content and will find it difficult to concentrate.

Too much word space

With the taste for narrow spacing still growing, some authorities suggest that the ideal word space is the width of the lower case 'i' in the type being used. For this width to be practical however, there is a need to reduce the set-width of the font being used.

Space between groups

In display composition, correct spacing between groups can affect the appearance and readability of type matter. In this situation, the wishes of the person designing the job will govern the amount of space to be used. Variety is a very important principle in spacing, just as much as type face selection or type sizes. Uniform space between groups in display setting leads to monotony and as a consequence, an uninteresting appearance.

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OF CENTRAL PLAZA**

We take jewels seriously!

In spite of the necessity for variety in spacing between groups, it must be achieved only after due consideration of how varying amounts of space are to be placed.

Space is used to separate one thought or section of copy from another, therefore the amount of space should be varied according to how isolated one thought is from another.

The readability of a piece of printed matter can be assisted or marred by the placing of the space between lines or groups.

Display

Display setting is the highest form of punctuation, this is where spacing of groups is applied. For example, if a job was set in solid composition, a comma would indicate a slight pause; a full point a longer pause; a fresh paragraph a new thought; a new chapter an entire change of thought.

In display composition punctuation marks are dropped at ends of lines only — but to serve the purpose, space is placed between lines or groups to the same replacement value of a comma, full point, etc.

Keep to a minimum the number of groups in a job, as the fewer groups in a job, the easier readability is achieved. Most jobs require no more than three groups.

To express these ideas in a simple way, we place space between lines or groups of equal in value to the degree of punctuation that would be otherwise used if the setting were solid, i.e. small space for comma, large space for full point, etc. The space is much more discernible than the punctuation mark.

In addition, in display we emphasise items according to their importance by the use of larger or bolder type faces. It is a good idea to refrain from excessive space which causes detachment of units, as too many points of interest in a printed piece cause difficulty in reading.

However carefully the arrangement of solidly set text matter may have been planned, with reference to type size and measure for example, and however carefully that matter is subsequently set, it can almost always be made even more readable by sensible leading.

The amount of leading in a given piece of text setting is usually decided by one or more of the following:

- The nature of the work;
- The design of the particular type face;
- The body size of the type;
- The x-height of the type;
- The weight and colour of the type; and,
- The measure to which the type is set.

Rules

The rule line (often, but not always, aligning at the baseline) is used extensively for horizontal ruling, including underscoring (which should be discouraged), vertical rules for design impact, to separate columns of text and for simple and convenient borders surrounding newspaper display advertisements.

Perhaps the thinnest possible line that can be printed is the Hairline. Care should be used in applying hairlines, and the printing requirements should be considered since such effects as reverse or overprint could present problems.

Aligning type with rules

When rules and type are used in combination in the same line it is important that the rule should line-up with the baseline of the type face.

Given Name _____

Given Name _____

First line incorrect; second line correct.

Letter spacing

Since display faces can exaggerate mistakes brutally, the typesetter should be aware of the critical choices that must be made.

The first of these is letter spacing. Inconsistencies of letter spacing may go unnoticed in text types, but they are very obvious and disturbing in the display sizes.

Many situations result in letter combinations that do not look right together, particularly when using capital letters. One obvious way to overcome this problem is to *kern* certain letter combinations. Kerning is the adjustment of space between two letter combinations.

INVITATION
INVITATION
RAILWAY
RAILWAY

Letter spacing of italic and roman.

Most program applications automatically take this into account. However, even this might not be sufficient and letter spacing will need to be done.

In setting lower case type, you will find that the letters are designed to fit together properly in any combination, giving the word a compact shape. When letter spacing is introduced, it weakens the shape of the word and reduces legibility. So avoid letter spacing lower case letters. Words set in all caps, on the other hand, often have inconsistent letter spacing which must be corrected.

**CONDENSED LETTERS
ARE WEAKEND BY
LETTER SPACING**
as are standard
lowercase letters

Letter spacing should be used properly.

Avoid a large amount of letter spacing with condensed letters. These letter styles are specifically designed to be set close together and will appear strange and unappealing if set too far apart.

Since reducing the amount of space between the letters may not be desirable, we must consider the space between closer letters in order to make them consistent with the letters that are further apart.

The peculiarities of the capital letters make them broadly divisible into three groups with regard to the requirements of letter spacing. These groupings will assist you in deciding which letters may/may not require extra space.

AFLPTVWY
Group 1 — No additional spacing

BCDEGJKOQRSXZ
Group 2 — Minimum additional spacing

HIMNU
Group 3 — Maximum additional spacing

Grouping for spacing of capital letters.

Remember, as you increase letter spacing, you may also have to increase the word spacing so words do not run together.

Vertical setting of lines

Occasionally, display lines are set vertically. If it is appropriate to treat an unimportant line or lines in this way (important lines should not be treated so) it makes for easier comprehension and a much cleaner and therefore stronger pattern if the line is set normally and then placed on one or other of its ends and not set with the letters the right way up, and one below the other, e.g. Hotel signs.

V	S	O	H	s	a
E	E	F	E	e	f
R	T		R	t	
T	T	L	T	t	l
I	I	I	I	i	i
C	N	N	C	n	n
A	G	E	A	g	e
L		S	L		s

Apart from these advantages, the normal line setting placed on one or other of its ends, that is, with the feet of the letters facing left to right, will practically always occupy less depth, and where M's and W's occur, less width, than the setting with letters placed the normal way up one below the other.

Type arrangement

There are five basic ways that lines of type can be arranged for a given piece of composition they are: Justified, Range Left, Centred, Range Right, and Asymmetrical.

Justified

Justified is the most familiar method of type arrangement, especially for books, magazines, and newspapers. The lines of type are kept all the same length so that the lines are flush left and right. In order to make the lines equal, the word spacing is adjusted so that each line fills the entire measure.

Character in types has to do with the impression made by the individual forms, their proportions, and the intangible something in them that makes the letters of each word hang together to form.

Justified setting

Advantages

- This arrangement is best suited for sustained reading comfort.
- The pages assume a quiet look and do not distract the reader.
- It allows the reader to concentrate on the content rather than the design.

•

Disadvantages

- If the line measure is too narrow there could be a risk of poor word spacing.
- Words may be poorly hyphenated at the end of lines.

Range Left

This arrangement is the second most widely used method for composition; most poetry and typewritten copy appears this way. The type is set with even word spacing and each of the lines will vary in length.

Character in types has to do with the impression made by the individual forms, their proportions, and the intangible something in them that makes the letters of each word hang together to form.

Align left setting

Advantages

- The even word spacing creates a uniform overall texture.
- It is ideal for setting type in narrow columns.
- Hyphenation of words is at a minimum.
- The risk of *rivers of white* flowing down the page is eliminated.
- Lines can run either long or short, hyphenated words are virtually unnecessary.
- The ragged edge of the right adds visual interest to the page.
-

Disadvantages

- If lines are set the same approximate length it can be a disturbing factor in the design.

It is important that the ragged edge should create a pleasing silhouette, convex rather than concave.

Centred

In this arrangement, the lines of type are centred on the page. When using centred type the length of the lines must be varied enough to create an interesting silhouette. To control the shape, a minimum and maximum line length should be indicated.

Character in types has to do with the impression made by the individual forms, their proportions, and the intangible something in them that makes the letters of each word hang together to form.

Align centre setting

Page 100

Advantages

- The even word spacing creates a uniform overall texture.
- Hyphenation of words is eliminated.
-

Disadvantages

- Reading centred lines is tiring, therefore it is better suited to small amounts of copy.

Range Right

In this instance the lines are aligned at the right so that the left side is ragged.

Character in types has to do with the impression made by the individual forms, their proportions, and the intangible something in them that makes the letters of each word hang together to form.

Align right setting

Advantages

- Since this form of type arrangement is infrequently used, it can create an interesting layout.
- The even word spacing creates a uniform overall texture.
- Ideal for setting type in narrow columns.
- Hyphenation of words is reduced to a minimum.
-

Disadvantages

- Visually, it is an interesting layout, however this setting demands more concentration on behalf of the reader.
- The reader is accustomed to reading from left to right, a ragged left edge increases reading difficulty.

Asymmetrical

In this arrangement, the lines have no predictable pattern in length or placement. The simplest method of controlling this effect is to have the copy set with specified line-breaks and then arrange the lines yourself in mechanicals. There are no rules and probably no two typesetters would break the lines in the same place.

Character in types has to do with the impression made by the individual forms, their proportions, and the intangible something in them that makes the letters of each word hang together to form an agreeable whole.

Asymmetrical setting

Advantages

- Since this arrangement is not frequently used, it can create an interesting layout.
- It maintains even word spacing.

Disadvantages

- Visually it is an interesting layout, however this arrangement demands more concentration on behalf of the reader.

Reading lines set asymmetrically is tiring, therefore it is better suited to small amounts of copy.

Classification of Type

An important factor in the composition of a piece of printing is the selection of the correct typefaces. Choosing the right typeface makes clear the sense of the message, and imparts that atmosphere or environment which enables it to be more easily understood.

The number of typefaces in use today runs into the thousands and as such presents difficulty in selecting the appropriate design for a particular job. Because there are so many type designs to choose from, it is easier to first choose a general type style or *classification* to suit your graphic design, and then, look for a particular typeface that relates to that classification. Although there are well over 32 unique type classifications, the simplest form, as follows, places type into seven *broad* classifications:

Roman (Serif)

Serif is an all-inclusive term for characters that have a line crossing the free end of a stroke. This style face, said to have been invented by the Romans, is also commonly referred to as 'roman'. It is the one most often used and also one of the most legible styles. The style is very comfortable and familiar to all readers and is therefore used in the bulk of reading material.

ABCDEF GILM
NOPQRSTVX

'Tranjan Letter' shapes based on
ancient Roman lettering

The Serif typeface is then further classified into Humanist, Garalde, Transitional and Didone, according to their stress and serif-form as follows:

Humanist
Garalde
Transitional
Didone

ROMAN

Humanist Faces:

Stemple Schneidler, Centaur, Italia, ITC Berkeley

Garalde Faces:

Bembo, Garamond, Plantin.

Transitional Faces:

Times New Roman, Lucida, Baskerville.

Didone Faces:

Bodoni, Walbaum, Americana.

Humanist (Venetian) faces are named after the first roman typefaces that appeared in Venice in 1470, Humanist typefaces were initially designed to imitate the handwriting of Italian Renaissance scholars. These types that are characterised by their strong, bracketed serifs. The letters are in general wide and heavy in colour. Other characteristic letters are the wide lower case *e* with a diagonal bar to the eye. A noticeable feature of *true* Humanist types is the square full point.

These types have a small x-height, moderate contrast between strokes, and an acute 'angle of stress' and do not lend themselves to modern design treatments of type such as reverse or stipple. The style prints best on a unsized stock in black or brown ink.

Garalde (Old Style) were designed centuries ago by such masters as the French printer Claude Garamond and the Venetian printer Aldus Manutius. Garalde typefaces include some of the most popular roman styles in use today.

These faces have rounded serifs and moderate contrast between strokes. The letters are open, rounded and very readable. The thick strokes of curved letters are off-balanced. The 'angle of stress' of these types is less acute than Humanist types.

Like Humanist, these types do not suffer reversal and stippling well, except in large sizes. Prints best on an unsized, off-white stock, in black ink.



Print

The choice of print method depends on many factors such as:

Quantity

Number of colours

Print Size

Medium to be printed on

Print quality required

Finishing required

Cost

Printing Methods

Offset Lithography

This is the most popular printing technique used for most printed matter we encounter such as leaflets, booklets, magazines, catalogues.

The separated image is exposed onto film through a halftone screen. The resulting "Lith" is then exposed onto a light-sensitive plate (sometimes made from zinc, aluminium and even special paper stock). When exposed to a strong light source, the transparent areas let light through the Lith onto the plate. The chemicals on the plate react to the light so that when the plate is treated with further chemicals, the print areas become resistant to water. This is the basis of Lithography, the fact that oily substances repel water. When the plate is dampened and oily printing ink rolled across its surface, the ink will adhere only to the treated areas, i.e. the image areas. The term "Offset" refers to the fact that a large soft roller is rolled over the plate picking up the ink and offsetting it onto printing paper. For full colour printing there will usually be four full printings, one for each of the process colours. However, these days printing presses are able to cope with up to five and perhaps six colours allowing for the use of special inks such as fluorescents, gold, silver and varnishes.

Offset lithography is the most cost-efficient and fastest method of printing hence the reason it is so widely used.

Screen Printing (Serigraphy)

This is one of the most ancient methods of printing attributed to the ancient Chinese and often called Silkscreen printing. This is because the meshes used in the printing were made of silk before synthetic fibres were introduced. Screenprinting was the preferred method for large-scale printing and for printing onto anything from t-shirts to circuit boards and glass. High speed, large format inkjet printing and other advances in print technology have made Screenprinting less competitive for certain types of work.

At its simplest, Screenprinting involves making a stencil which is adhered to a fine mesh screen attached to a frame. Using a squeegee, the ink is pushed through the stencil and onto the print surface. A halftone from a colour separation can be used as a stencil. This can be adhered by exposure onto a screen coated with light-sensitive emulsion or by exposing onto a light sensitive film, which is treated and then attached to the screen. The photo-sensitive emulsion reacts to light, i.e. where the light penetrates the stencil and hardens. Where the light does not penetrate, the emulsion will remain soft. When the screen is washed, the soft areas of the emulsion wash away leaving just the image area. The main advantage of Screenprinting is its adaptability. One screen can be used again and again, but also easily reconstituted. There are no limits on the amount of colours that may be used and light colours can be overprinted easily onto dark colours.

Flexography

The image to be printed is formed onto a rubber plate, which is then wrapped around a cylinder. It is a high speed, high output method of printing favoured by the packaging industry for use on non-porous materials, polythene bags, cellophane etc. Flexography also favours large-scale work with fast-drying inks. One of the main advantages of flexography is that changes can be made to the plate easily by making a patch, so that the whole plate does not have to be reproduced. One of the disadvantages of flexography is that halftones and small text do not print particularly well as the ink tends to spread.

Gravure

This is known as an Intaglio method of printing just like etching. This means that the image is bitten into a plate, the ink pushed into the bitten areas, the surface wiped clean and the paper pressed onto the plate by a rubber roller. The paper lifts the ink from the bitten areas. The image is formed by engraving the screened image onto a metal cylinder. Gravure is a high speed, long-run process suited to halftones and newspapers, postage stamps etc. Its disadvantage is that plates are expensive to produce and therefore mistakes are costly. Also, the whole image needs to be screened, therefore text does not always reproduce too well.

Collotype

A very rare printing method these days, but is the only one to produce real continuous tone without using a halftone process. A negative is made of the image, which is then contact-printed onto an aluminium plate coated with light sensitive gelatine. The amount of hardening of the emulsion depends on the amount of light reaching the plate through the negative. It is a slower method of printing used for high quality reproduction work and for very short runs.

Photocopying

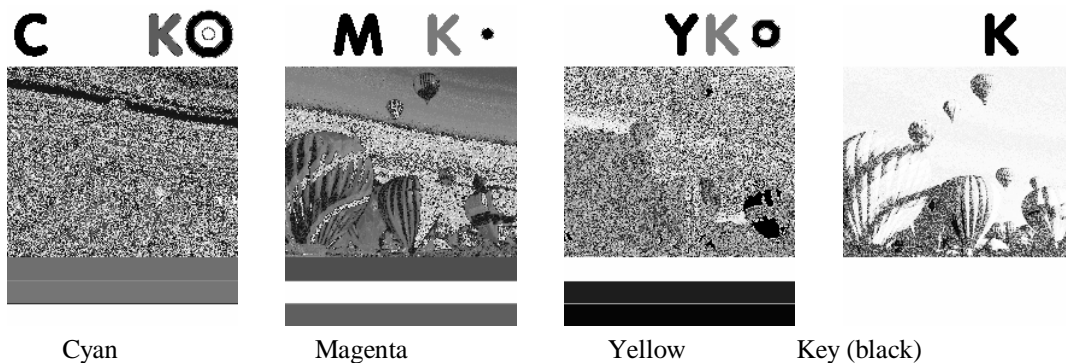
Photocopying is now the most common method of reproduction. We are so used to the process that we do not consider it to be a method of printing at all. There are many styles of photocopier available, but they mainly work along the principle of projecting bright light at an image. The light is reflected from mirrors onto an electrostatically charged drum. Toner attaches itself to the charged areas of the drum and the image is fused onto the paper using heat. In modern laser copiers a laser is used to draw the image onto the drum. The advantage of photocopiers is that the cost is small for fairly long runs and, without the need for processing, is very quick. The disadvantages of photocopying are that there are restrictions in printable size, the choice of paper stock is limited and the quality is variable.

The cost of colour photocopying machines is falling at such a rate and the quality is increasing so that copiers may soon compete with small colour offset lithography, at least for short runs. Technology is such that laser copiers now work straight from computer maximising quality and allow editing.

Print Preparation

The modern print process is still changing as regards reproduction technology, but the basic process is the same. The computer files may be sent to the printer or graphics bureau who may be asked to make up a high quality proof such as a Matchprint® or Cromalin® which are as near to the printed document as possible in terms of colours and resolution. These can be very expensive, but are cheaper in the long run than having to recreate an entire plate or worse still reprint an entire publication.

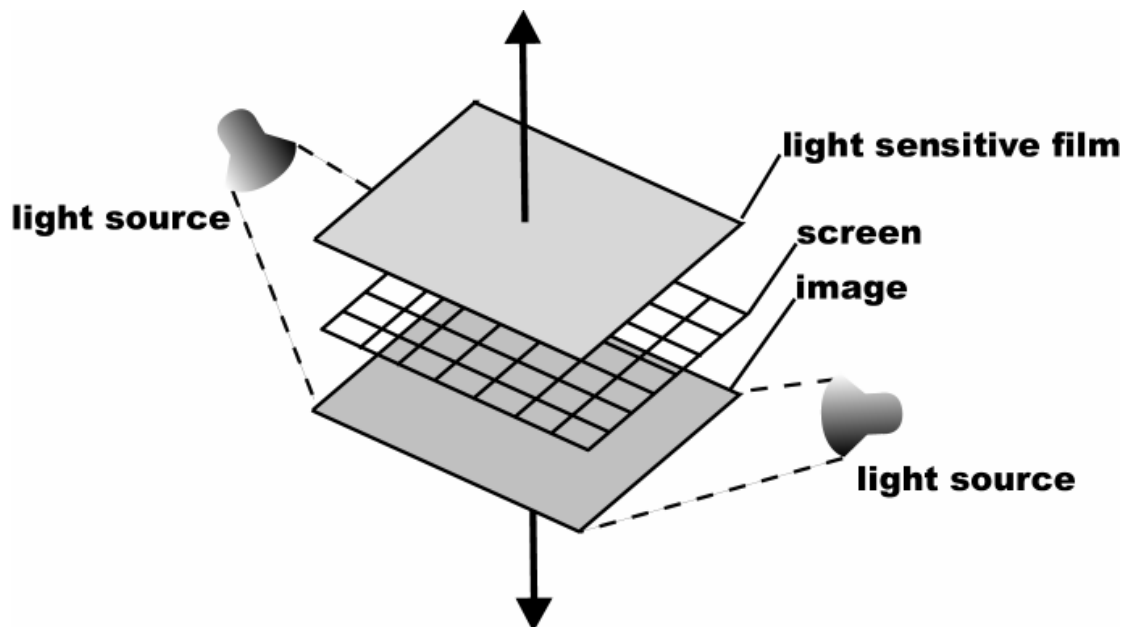
Traditionally, when the final proof is agreed, the designer will make up "Colour Separations". These split the image up into its constituent colours for four-colour printing. There will be one separation each for Cyan (Blue), Magenta (Red), Yellow and Key (Black), known as CMYK colour. In theory, there need only be three colours in printing, because every colour is made up from the three primary colours, red, yellow and blue. As a result of the impurities of printing ink and the reflective qualities of paper, the three colours mixed would make up a muddy brown, so a black separation is added to give definition.



CMYK



CMYK

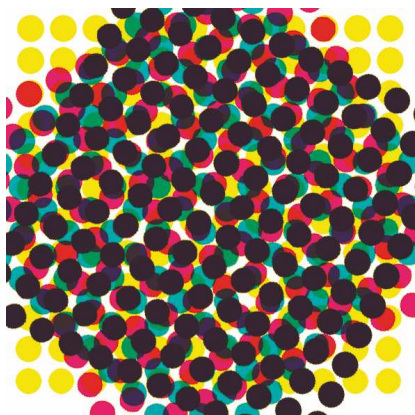


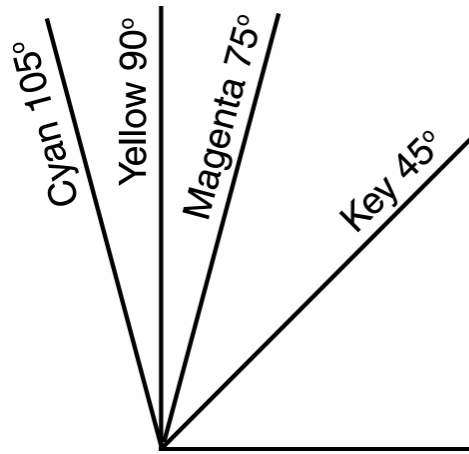
How a process camera works

The original image is photographed through a "Process Camera". This works by photographing the image through colour filters which split the image up into three colours with a further one made up for black. Each separation is photographed through a fine mesh known as a halftone screen which splits the image up into a series of dots. These dots vary in size and proximity depending on the depth of tone required.

Looking closely at a newspaper picture reveals these dots, but in full colour printing the dots tend to be much closer together and smaller, so it is more difficult to see them with the naked eye.

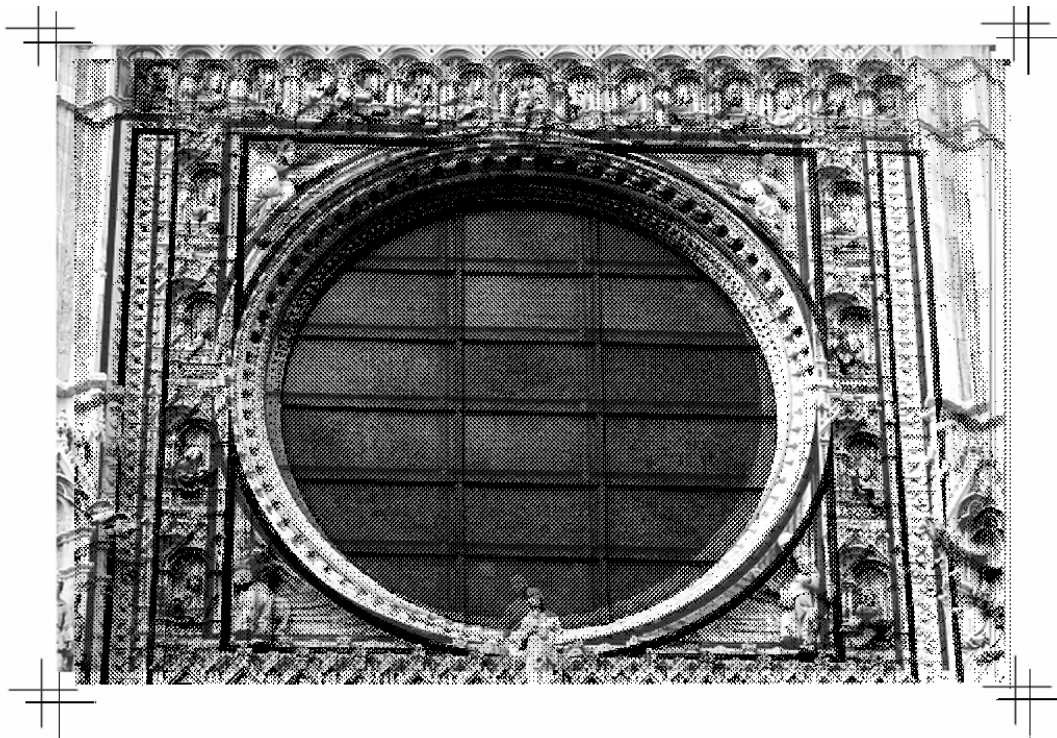
The resulting photograph for each colour will usually take the form of a "lith" which resembles a black and white negative except that it consists entirely of black dots. The other important factor in making the halftones is the direction of the dots. The screens used for converting the images into dots must be set at different angles. If not, the effect known as moiré occurs. This interferes with our perception of the image making the pattern of dots used very obvious. By setting the screens at different angles this can be eradicated.





Common screen angles used in printing

The print process involves printing each of these colours directly on top of each other. This is the process known as registration. It involves placing crosses (registration marks) at the corners of the image. When setting up the printing of a document these must be perfectly aligned to make sure the colours sit correctly on top of each other. Bad registration is sometimes seen on newspapers and on packaging.



An example of bad registration