Technical English
Unit 5
professional English
Locating and setting out

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Spring 2017

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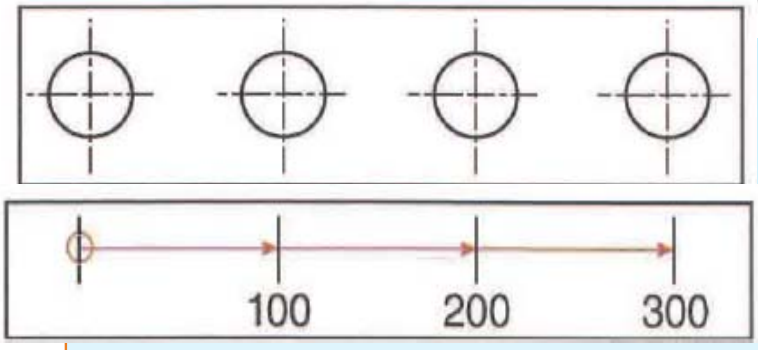
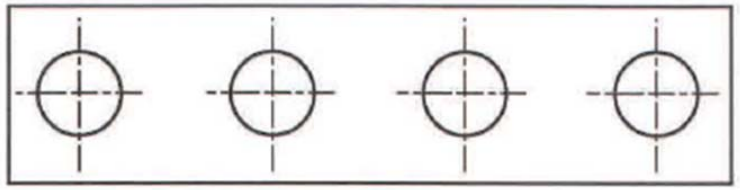
A. Initial design phase

- The drawing below shows the position of some holes for bolts. The distances between the holes can be shown as running dimensions or as chain dimensions. In both cases, the centreline (CL)- a line through the centre of the hole- is marked (drawn), and the distances between the centrelines are given. Distances between centrelines are called centre-to-centre (c/c) dimensions. The holes below are at 100 mm centres.



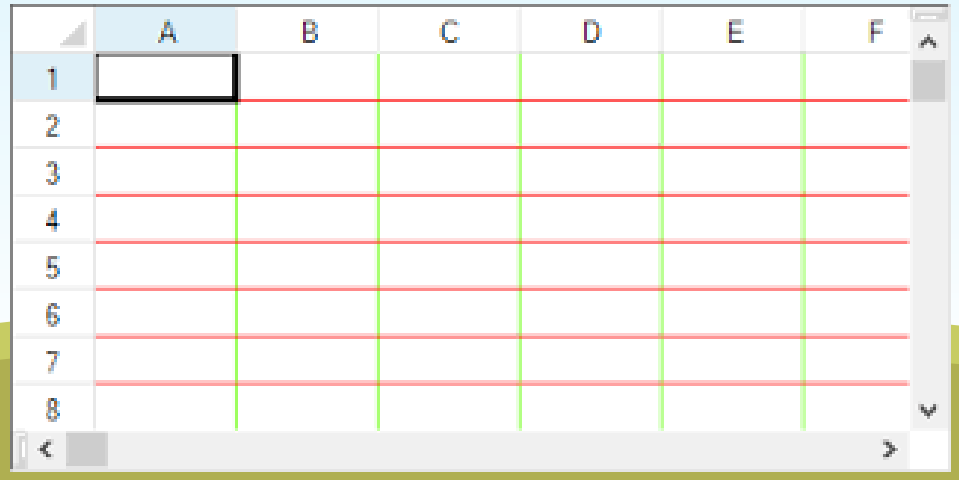
A. Initial design phase

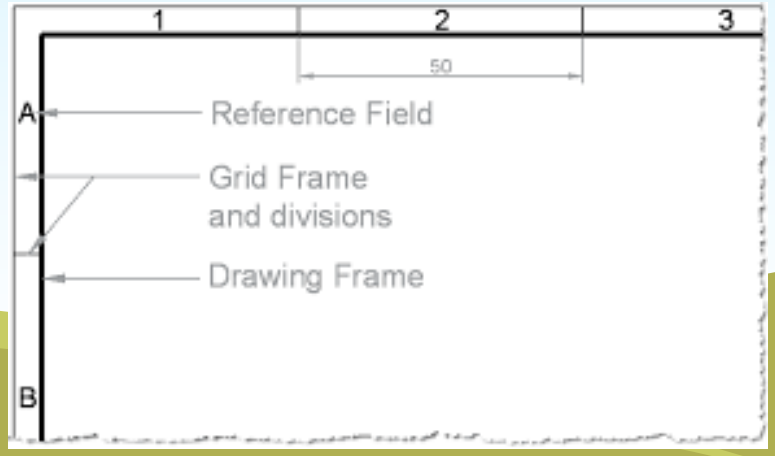
- Centrelines are often used as **reference points**. These can be measured from, in order to **locate** -that is, give the position of- points on components. The measurements are **offset** (<u>located away</u>) from the centreline - each is at a certain distance from it, and the **offsets** are measured **at a right-angle** to the centreline (at 90 degrees to it).
- Note: We can say *at a right-angle to* X, *at 90 degrees to X,* or *at right-angles to X.*



B. Grids

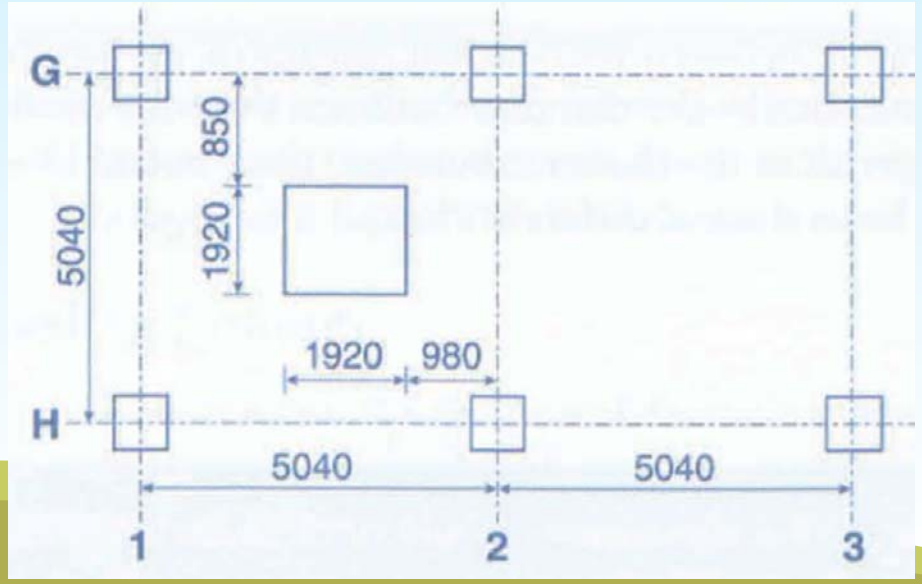
- In large designs, notably those of structures, **grids** are used for horizontal positioning. The **gridlines** have numbers and letters. All numbered gridlines are **parallel with** one another that is, they are straight, and are regular distances apart. Lettered lines also **run parallel with** one another, and are **perpendicular to** (at a right-angle to) the numbered lines.





B. Grids

- The plan below shows part of the floor of an office building. The **perpendicular** gridlines **intersect at** (cross at) the centres of columns. An opening (hole) in the floor is shown using **coordinate dimensions**. These allow the site engineer to set out (mark the position of) the opening by **squaring off** the gridlines- marking lines that run at a right-angle to them- and then measuring along these lines using a **tape measure**.

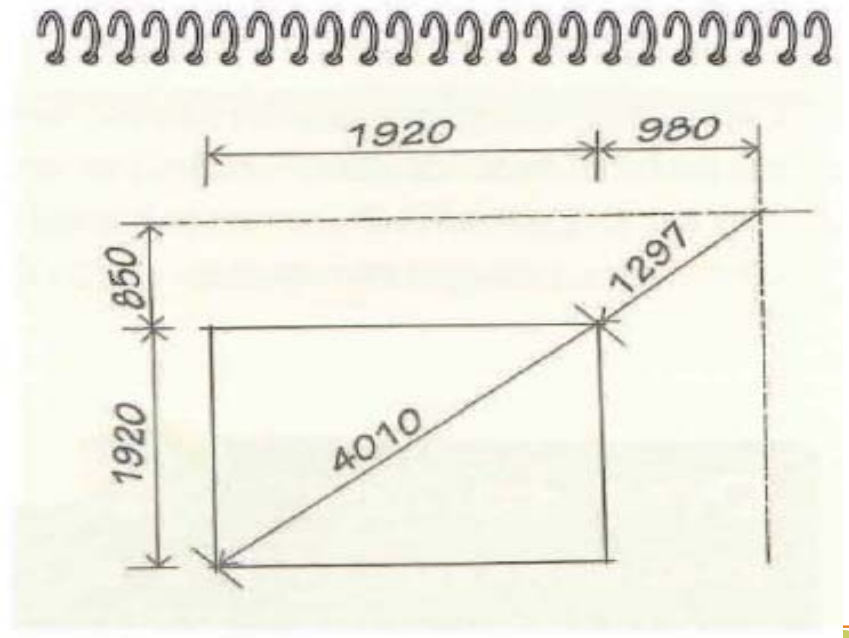


B. Grids

A **theodolite**- an optical device used for measuring angles- can be used to square off gridlines accurately.

B. Grids

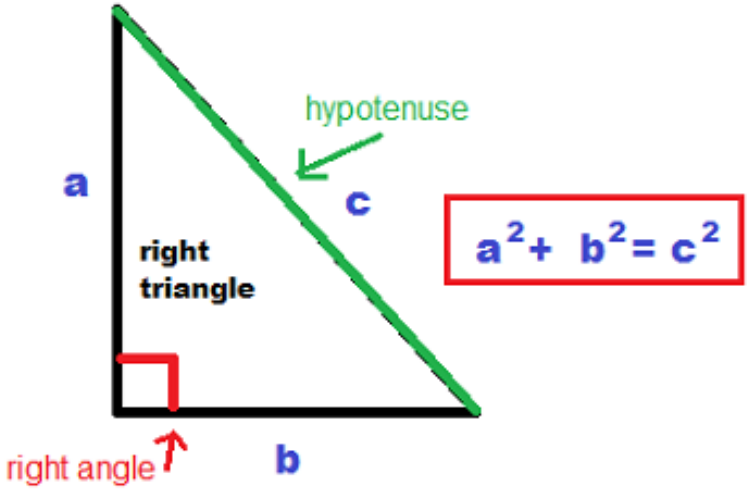
- To **double-check** dimensions- that is, carry out an extra check - **diagonal measurements** can be used, as in the engineer's sketch below.



Site engineer's sketch

B. Grids

- The length of **diagonals** can be calculated using **Pythagoras's Theorem**



Exercise 5.1 Look at the sentences about the design of a ship. Replace the underlined words and expressions with alternative words and expressions

1. The handrail is fixed by 115 brackets, which are <u>175 mm apart, between their centres</u>.

1 at 175 mm centres

2. The dimensions are measured from the <u>line down the middle</u> of the ship.

2 centreline

3. How far is the widest point of the ship <u>located away</u> from the centreline?

3 offset

4 at a right-angle / at right-angles

4. Are the adjacent lengths of handrail <u>at 90 degrees</u> to each other?

5. These dimensions allow you to <u>establish the position</u> of the hole.

5 locate

Exercise 5.2 Look at the extracts from technical discussions on a construction. Complete the sentences using the words in the box.

1 According to this drawing, ... 8 runs along the external wall of the structure.

2 The positions were marked accurately – they were ..... by our site engineer.

3 The external wall runs along gridline 1, and the internal corridor wall runs along gridline 2, so the walls are ..... with each other.

4 I've marked a cross on the concrete floor, showing where the two gridlines ..... .

5 We need to show the position of the corner of the staircase with coordinate dimensions. There should be two ..... dimensions, taken from two gridlines.

6 We'll use the theodolite to ..... the gridline and mark a ninety-degree offset.

1 gridline

2 set out

3 parallel

4 intersect

5 perpendicular

6 square off

Exercise 5.3 Match the two parts of the sentences to complete the extract from a training manual.

In civil engineering, the following precautions can help to prevent costly setting-out mistakes.

(1) Always use a steel tape measure (never a plastic one)

(2) Check that both diagonals of rectangular shapes are equal

(3) Measure dimensions in two directions, from parallel gridlines,

(4) Add up chain dimensions to give running dimensions

a. to check that corners are right-angles.

b. to ensure it does not stretch under tension.

c. to prevent slight errors being multiplied.

d. to double-check your measurements.

1b, 2a, 3d, 4c

I see you
got right

Any Questions