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Tall Buildings

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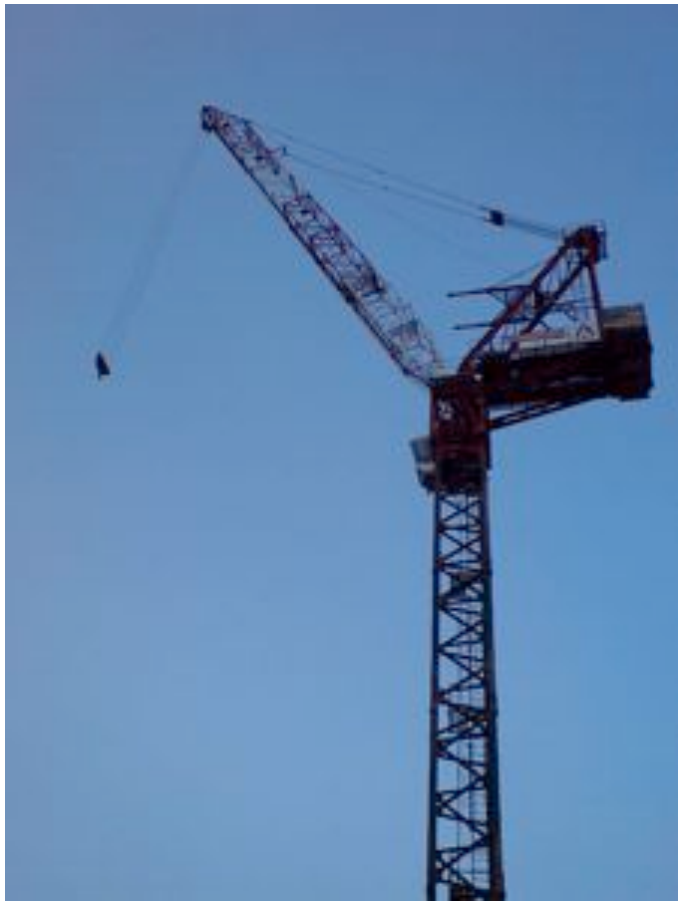
Tall Buildings Construction

- Construction work is more difficult as the building becomes taller
- Cranes are required to lift building materials to the height of construction
- Getting the correct geometry is essential to ensure that the building fits together and the crane is the appropriate size for the job.

Tower crane

- Look at this picture of a crane.



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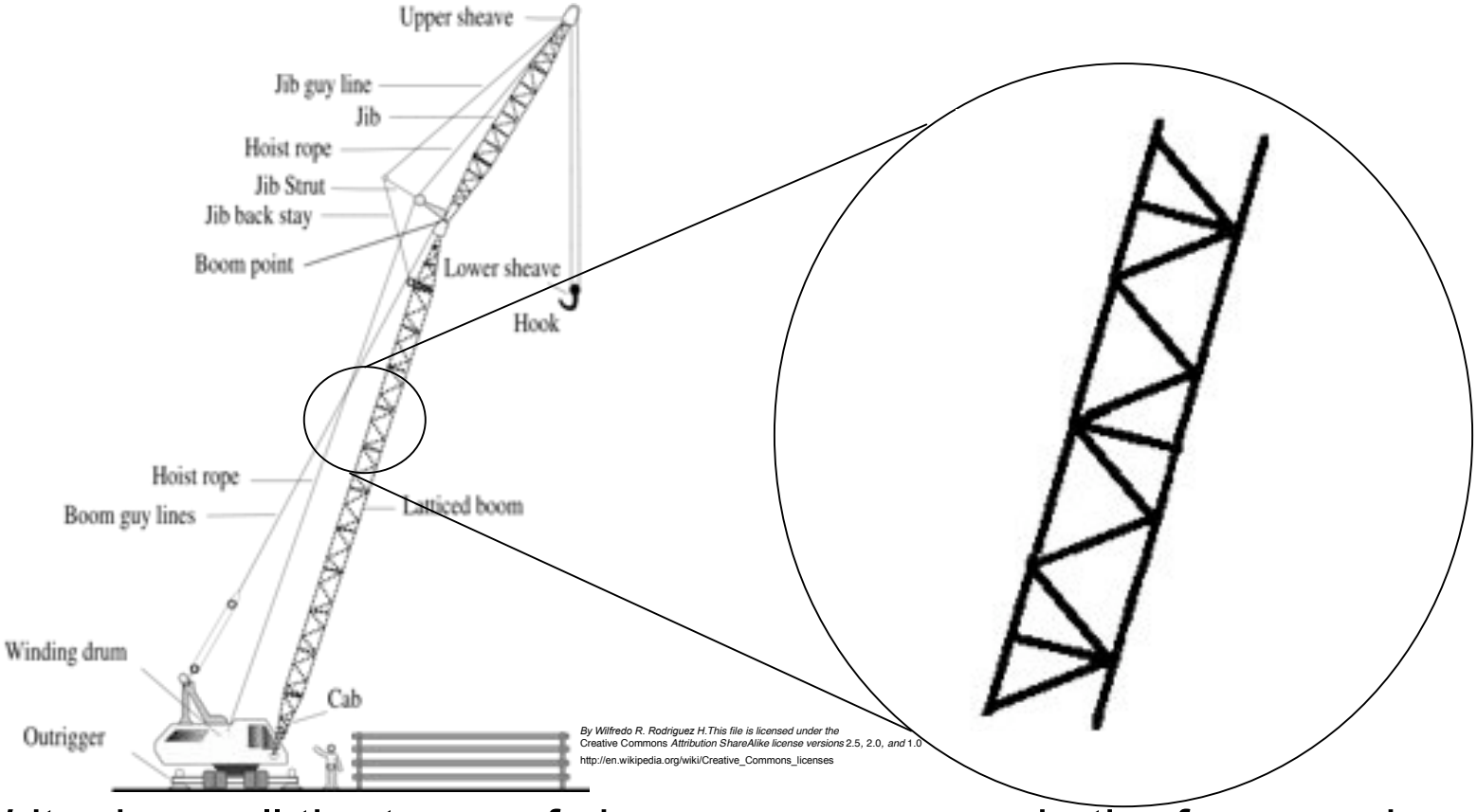
Geometry

- This picture shows the framework more clearly.



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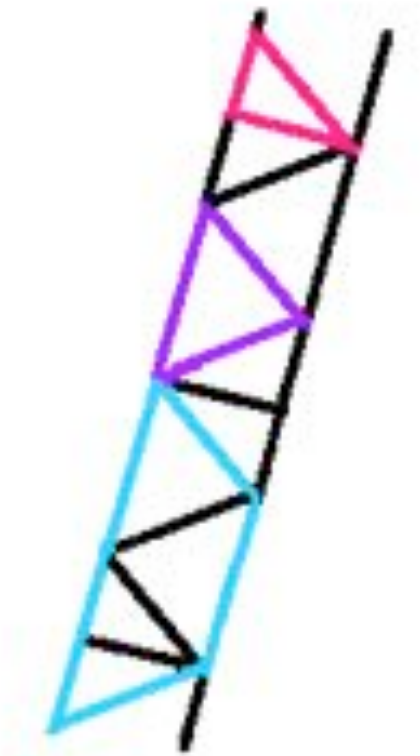
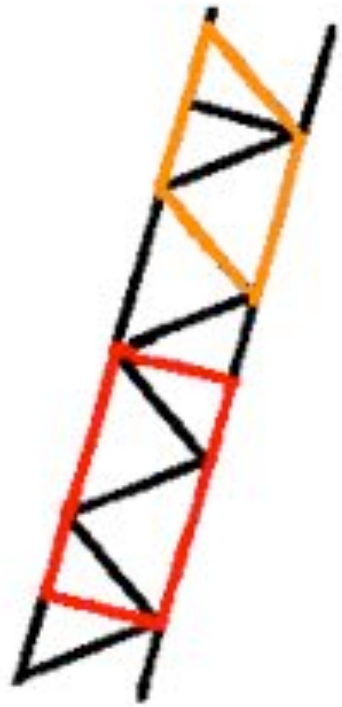
- Write down all the types of shapes you can see in the framework and their properties.

- Right-angled triangle
  - One angle is 90°
  - All angles add up to 180°
- Isosceles triangle
  - Two sides have the same length
  - Two angles have the same value
  - All angles add up to 180°
- Trapezium
  - One pair of parallel sides
  - Four vertices
  - Angles add up to 360°



- Parallelogram
  - Two pairs of parallel sides
  - Four vertices
  - All angles add up to 360°

- Rectangle
  - Two pairs of parallel sides
  - All angles add up to 360°
  - Four vertices, each with an angle of 90°



- Now think about how to find out angles and lengths from the picture of the crane. List all the possible methods you know of.

  For example: Pythagoras' Theorem

- Pythagoras' Theorem
- Sine rule
- Cosine rule
- Corresponding angles
- Alternate angles
- Angles in a triangle equal 180°
- Trigonometry

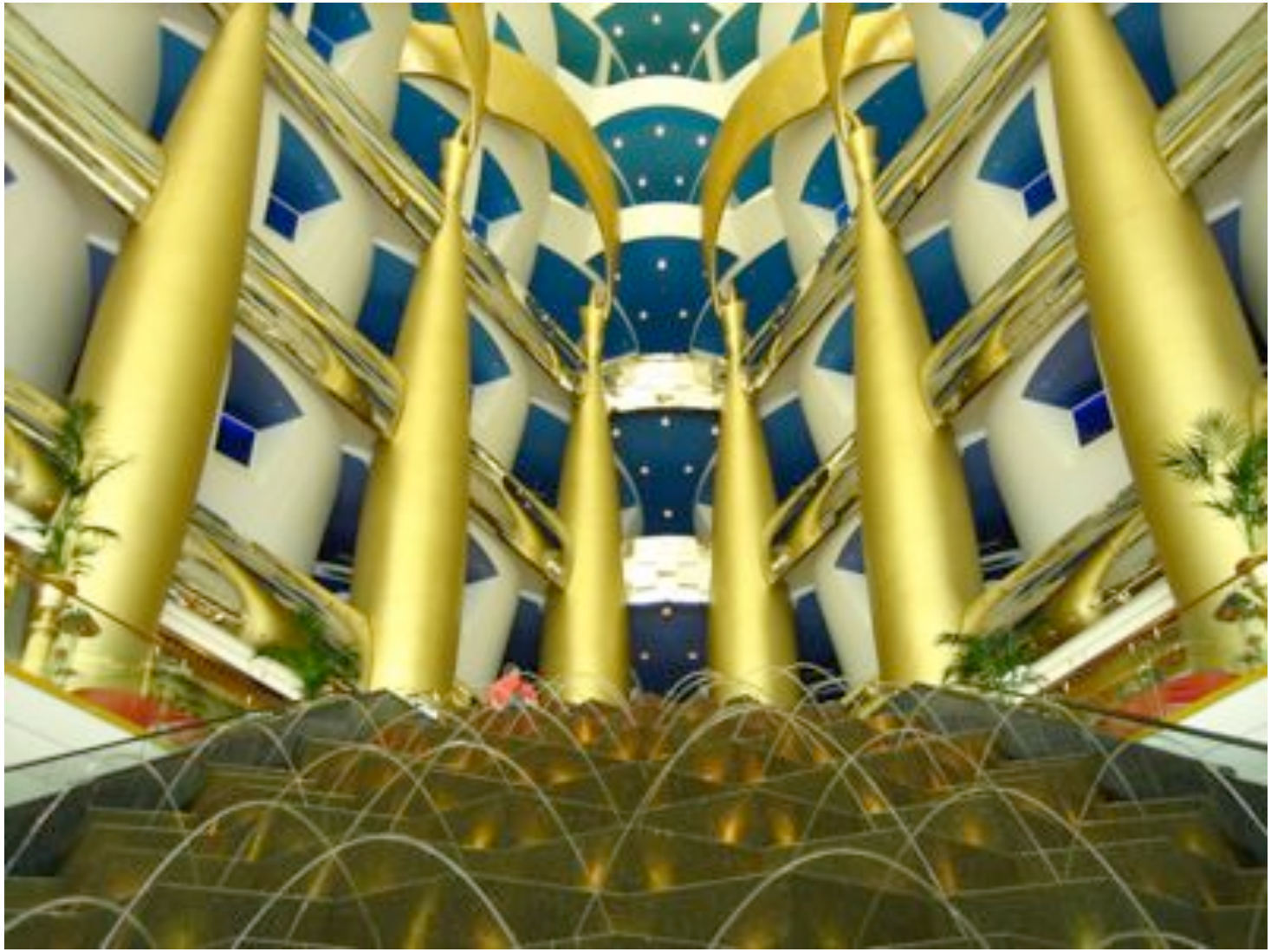
Activity 1

- Now try the first section of the worksheet about cranes aiding in the construction of tall buildings.

Burj al Arab

- One of the tallest hotels in the world
- 321 m high (to top of spire)
- Built in the shape of a sail on an artificial island in Dubai in the United Arab Emirates

- Looking down on the Atrium



- Entrance with fountains

- Helicopter landing-pad

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Geometry in Buildings

- Since this building is designed to look like a sail there are many unusual angles and shapes in the design.

- We will look closer at the geometry of the building using various theorems.

Activity 2

- Now try the questions about the Burj al Arab Hotel.
- Remember to think about more complex theorems, such as circle theorems when completing the activity.