

Listen to this excerpt of a talk given by an electrical engineer visiting a sixth form college.

**Optional activity:**

While you listen, decide whether the following sentences are true or false.

Sentence	True or false?
1. Recently great advances have been made in motor technology.	
2. Engineers are constantly looking for new ways to use existing models.	
3. Engineers have more freedom for experimentation than in Faraday's times.	
4. The newest motors lose more heat than the traditional motors.	
5. The newest motors are more compact than they used to be.	
6. A new motor developed by Omron may replace motors currently used in hydraulic systems.	

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These days engineers – rather than setting out to create new inventions – work on refining designs that already exist. These refinements can be related to size, shape, increased power or more efficiency. And usually we are talking about a combination of these refinements.

Let's take the motor as an example. You are probably all familiar with the name Michael Faraday who invented the electric motor in the 1820's. Well, the first motor was a fairly simple device – and we have been improving on its design and looking for new applications for it - ever since its birth.

These days there are endless projects going on around the globe where engineers are trying to modify existing motors in order to be able to use them in new contexts - and in traditional contexts – but with better – more efficient results.

In Faraday's time engineers and scientists had a more or less free rein when it came to experimenting and research. If they had enough money to carry out their plans then there was nothing to stop them. These days engineers have to take into consideration all kinds of environmental issues. We are driven by different quests – to conserve energy is one of the most important. Industry demands quality and efficiency but we must never forget the environmental issues that lie behind every single engineering advance.

So – back to motors. What's happening at the moment is very exciting. A new kind of motor has been developed which uses internal permanent magnets embedded within the rotor. These magnets improve the motors' flux density and torque density. What does this mean? Well, for a start the motors use less energy – considerable less than traditional motors. This is because there is less heat loss. A side effect of this is that the machines using the new motors have increased precision. Size and speed are two further aspects. . The new motors are a lot smaller and speed control is more efficient. This is especially important when we use the motors in gearboxes or cranes for example.

Omron has just developed a motor with an internal magnet that is being applied to high power applications. Things like huge industrial plants and building projects. There is already talk of using the new motors to replace the ones currently used in hydraulic systems.

Yaskawa Electric is one of the world's largest manufacturers of motors. They have developed a motor with a power rating of 55KW and a rated speed of 1500rpm. This is much greater power than we have seen up till now. So, motors are increasing in power and decreasing in size. In the world of engineering this is a notable achievement.

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**Answer key:**

Sentence	True or false?
1. Recently great advances have been made in motor technology.	True
2. Engineers are constantly looking for new ways to use existing models.	True
3. Engineers have more freedom for experimentation than in Faraday's times.	False

4. The newest motors lose more heat than the traditional motors.	False
5. The newest motors are more compact than they used to be.	True
6. A new motor developed by Omron may replace motors currently used in hydraulic systems.	True