Listening 2 Hyperloops

Audio script

Hyperloops

PROFESSOR: OK, everybody. As you'll remember, we have a guest lecturer today. This is Dr. Zahra Demir from our applied engineering department. She's going to tell us about our university team's entry for a Hyperloop competition. Over to you, Zahra.

DR. DEMIR: Thanks. OK, so before I start talking about the competition, does anybody know what a Hyperloop is? No? Well, a Hyperloop is basically a revolutionary new form of transportation. The whole world will be talking about Hyperloops in a few years – they're going to change everything! They've been called "the fifth form of transportation," after cars, trains, boats, and planes. The basic idea is that people travel in small vehicles called "pods," which travel through long tubes from one city to another. Those tubes can be underground – or even under the sea – or they can be above the surface.

PROFESSOR: So, they're like railroad trains, then?

DR. DEMIR: Well, not really. Hyperloop pods don't have wheels. They use the power of magnets to keep them up. There are magnets in the tube and magnets in the pod, and they push each other apart. That's what makes the pod look like it's floating in the air. But the really clever part is that we can also use magnets to drive the pods along the tubes. We can use electricity to control the magnets, so that the magnets in front of the pod pull it, and the magnets at the back push it. That means the pods can travel at incredible speeds – much faster than trains, and they use basically no fuel at all.

PROFESSOR: Sorry, can you explain that last part more clearly. How do they travel so much faster than trains? And how do they use so little fuel?

DR. DEMIR: OK. So, let's think about trains for a moment. They have to fight against two incredibly strong forces. One force is friction – the force that makes it harder to move things that are touching each other. The train is touching the tracks, so the tracks are literally fighting against the engine, dragging the train backward. But as I said, in a Hyperloop, the pods aren't touching anything, so there's basically no friction to fight against. And then the second force is air resistance – the way the air slows you down as you move. When you're trying to make a vehicle go fast, air resistance is the worst thing in the world! But in a Hyperloop, you can pump out most of the air from the tube. So that means there's almost no air, and therefore no air resistance, as well as no friction. So, there's nothing to slow the pod down, and it's incredibly fuel-efficient. The speeds we can reach are unbelievable. The aim is to reach hypersonic speeds – that's over five times the speed of sound. You'll be able to travel from one end of the country to the other in no time at all!

PROFESSOR: OK, but what are some of the challenges? Presumably, you'll need to control the magnets carefully so that they push the pods along.

DR. DEMIR: Well, that's actually a fairly simple engineering challenge – a child of five could solve it in minutes. It's just a question of getting a computer to turn the magnets on and off rapidly to drive the pods forward. It's quite a common form of motor. A much bigger challenge will actually be slowing the pods down when they reach their destination. They'll have been traveling at almost four thousand miles an hour, so if the brakes are too weak, it'll be extremely dangerous. And if they're too strong, it'll be very uncomfortable for the passengers. So, it'll be hard to find a good balance between comfort, safety, and speed. There are also many challenges connected with the size of the project. For example, how do you ensure there's almost no air in a tube that's a million miles long! How do you build those tubes in the first place, and make sure they're safe and strong?

And of course, the tubes might be underground or under the sea, which makes everything incredibly difficult. So those are all huge engineering challenges. But to be honest, some people are simply afraid of progress, and they don't like it when you try to do something new. There are plenty of powerful people and organizations that don't want Hyperloops to work, and they're putting up all kinds of barriers to slow down our progress.

PROFESSOR: Really? Why?

DR. DEMIR: Well, the transportation companies in this country are very worried that Hyperloops will destroy their business. I mean, if Hyperloops work, nobody will ever need to take a train or a plane again. So, they'll do anything to stop us from succeeding. It's all taking place in secret, so we can't prove anything, but I'm sure that's what's happening.

PROFESSOR: Hmmm … OK, so tell us about the competition. I understand you're up against teams from the best universities in the world, so it's going to be tough, I guess.

DR. DEMIR: That's what everyone says: that we don't have a chance because we're not as good as those other universities. But I think that's the wrong attitude. I think everyone has a chance – you just need to believe in yourself. Anyway, the competition involves designing pods that will travel along a test track. The fastest pod will be the winner – as long as it doesn't crash! The challenge is to design the shape so that there's as little air resistance as possible. Remember that we can't remove all the air from the tube, so we still need to make sure the air flows around the pod smoothly. Anyway, I am leading the team from our university. And to be honest, I think we've come up with a brilliant design. We've all been working on it 24 hours a day for the last ten months, and it's been going very well so far. We started out with computer simulations, to test various ideas. But for the past four months we've been building, testing, and modifying actual models, to check whether they work in practice, not just on a computer.

PROFESSOR: Excellent. So how does the competition work?

DR. DEMIR: Well, the first stage was last month, where they judged whether our designs have the potential to work. We've just heard that we got through that round, which is great. So now we'll have 12 months to build an actual working pod. So, it's a long process – by the end, we'll have been working on it for nearly two years. But it'll be worth it when we win.

PROFESSOR: I'm sure. So, what's the prize?

DR. DEMIR: There's no prize. We're just doing it for fun, and because it's a great way to learn. Now, I know what you're all thinking: How can we justify spending all that time and money on a competition with no prize! You probably think we should be reading books and writing essays instead. But in my opinion, practical projects like this are the best way to learn. And maybe we'll play a small part in making the world a better place.

Words and expressions

pod *n.* （太空船的）分离舱
magnet *n.* 磁铁
friction *n.* 摩擦力
air resistance 空气阻力
hypersonic *adj.* 极超音速的