

Flume Demonstration: Streamlines

SPEAKER Bob Holmes: Okay. Well, welcome to laboratory flume section on Lecture 4. In Lecture 4, we're gonna cover two main concepts. So we've talked about streamlines, stream tubes, that kind of thing. We're gonna show you what a streamline is. The other concept we're gonna talk about is the three types of energy: potential, pressure potential and kinetic energy.

So let's talk about what a streamline is first. As we insert a tube with a piece of thread on the end of it, you can see here that along this thread line we've got basically a streamline. Now, we basically define a streamline as that point or the curve that is tangent to the directional velocity at every point on the curve. But again, it's a bunch of words. Here you can see as that thread is dragged out through the flow, we can see that that is a streamline. The velocities are forming where that stream is gonna go.

Now, why is it waving up and down like that? Essentially, we have turbulent flow. We don't have everything nice and laminar, which we'll talk about in the next particular lecture, especially we'll show that in the flume demonstration in the next lecture. Well, you can see here that we've got basically a little bit of oscillation and that's due to the unsteadiness. Now, let's lower that thread down in the flow and you can see as we move down--again, the streamlines are pretty much downstream parallel to each other because even though we do have the waviness, once we settle in there and once--we'll get to the thread here at the very bottom of the flow here now--and you can see that even though we do have a little bit of unsteadiness, we still have it all in the downstream direction. So that's gonna be our main concept on streamlines.