Energy Loses in Real Fluids

S**PEAKER Bob Holmes**: Okay. In our previous section, we began the discussion of real flow--real fluids. Remember, in Lesson 4, we talked about ideal flow. Now we're talking about real flow. In ideal flow, the total head at any point along the flow is constant because no energy is expended in moving parcels of water from one cross-section to the next. Now remember, we talked about streamlines, so at any point along the streamline in an ideal flow, the total head, H, was constant all along.

In real flow, we know that we must expend energy in moving the parcels of water to overcome the friction and the turbulence, therefore the total head must decrease as the water parcel moves downstream. This expansion of energy is called head loss, and we symbolize it in our terminology as small "h" sub-l.

Now, on your screen, you're going to see that we've got the energy equation for a real fluid located there. You've seen this equation before. The only difference is now we've added the head loss to the end of the right side of the equation, that's small "h" sub-l, and we have superscript 1-2 added to that. That superscript means the head loss from Section 1 to 2. You'll note that we have the energy coefficient, the alpha one and alpha two, that are also in this equation. Again, they're added into this equation because we always like to use the convention of the mean velocity in the cross-section. So if we continue to use that convention, we have to have a correction factor in order to get at the true kinetic energy for that particular cross-section.

That concludes Section B on this particular lesson. I hope you'll stick around, and we'll go through an example in the next section. And then after that, we want you to proceed to Lesson 6, problems in the textbook.