Lighter Than Air Systems
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Lecture - 43
Tutorial Problem 07 on Change in Atmospheric Temperature and Superheat

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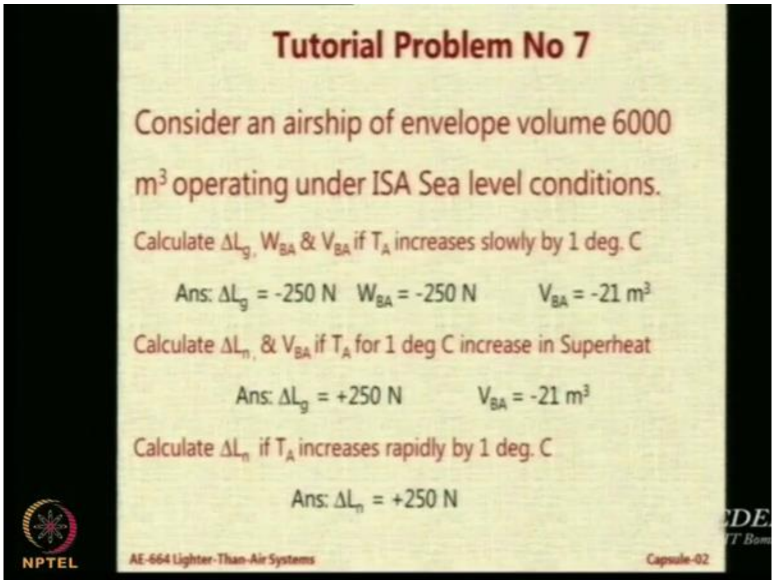

You have understood this let us see if you can solve this problem. So now we have an airship same airship same ISA conditions. And you want to calculate the lifting gas weight and the ballonet air weight and volume of ballonet air if there is a one degree change in the temperature and its slow. So, because it is a slow change in temperature, we have to refer to the previous formulae.

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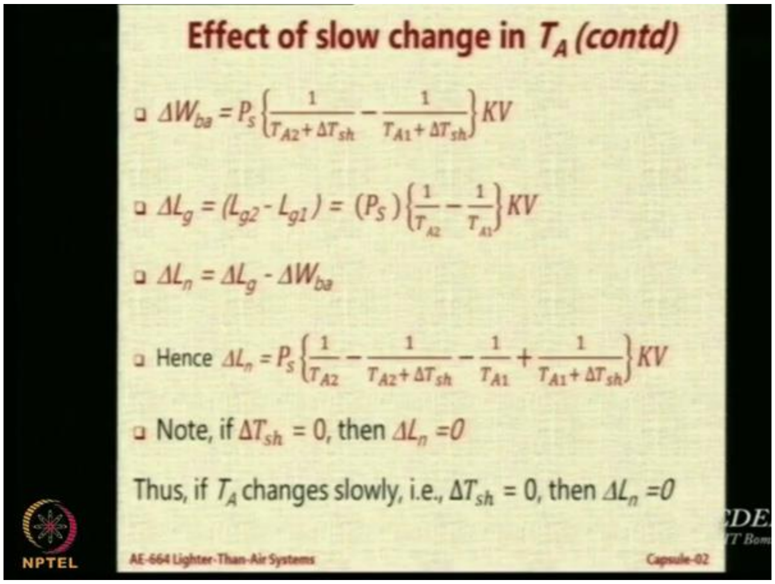

This is the new formulae for slow change in temperature. For using these particular formulae, you have to calculate for an airship that is flying at sea level under the ISA conditions T_A will be 288 K. P_s will be 101325 Pa, K already we must have calculated 0.03416, V is 6000 always ensure the units are correct. So, how much is ΔL_g 249 plus or minus, reduction.

Then what about ΔL_N it will be zero and what about the weight of a ballonet air? Same, correct, it will be the same. And you can calculate the volume of the ballonet air by looking at the ballonet air weight and the density of the ballonet air at sea level condition. What happens if this one degree is not because of ambient air temperature change, but the cause of superheat. So, it should differ or should be in the same?

Whether you add one degree because of superheat keeping T_s same or whether you make T_s 1 degree more and keep them superheat should there be any change? Think about it. The only difference that will happen is the numerical value. In one case there is an increase in one case there is a decrease but number remains the same. What happens if this is rapidly done not slowly?

So, for rapid, same or different; is the same the formula is the same. So, on that note, I think we should stop for today because already we have reached 12:30, but I honestly just want to make some announcements will continue from here in the next class.