Lighter Than Air Systems
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Lecture - 40
Tutorial Problem 06 on Effect of Superpressure

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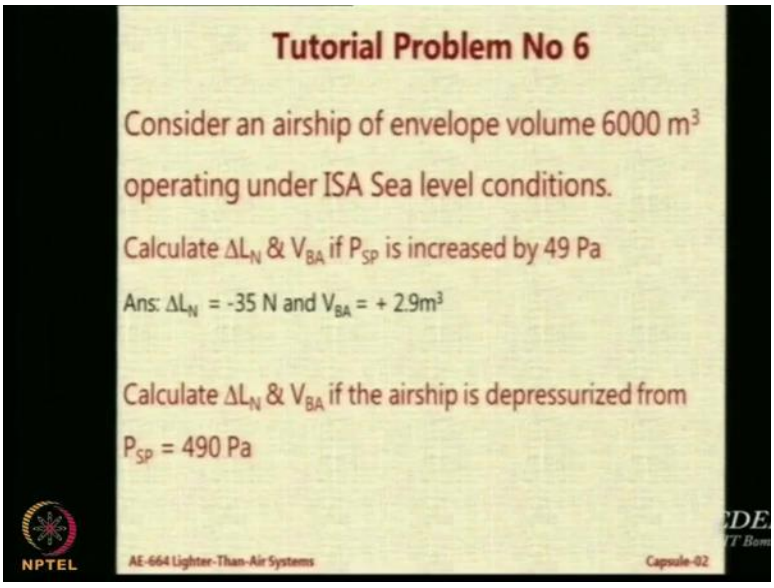

So, let us look at this particular expression. So, the same airship 600 meter cube operating on same conditions ISA. If the P_{SP} is increased by 49 Pascal calculate the ΔL_N and volume of ballonet. Give me give me the same expression. You will be able to get these two numbers.

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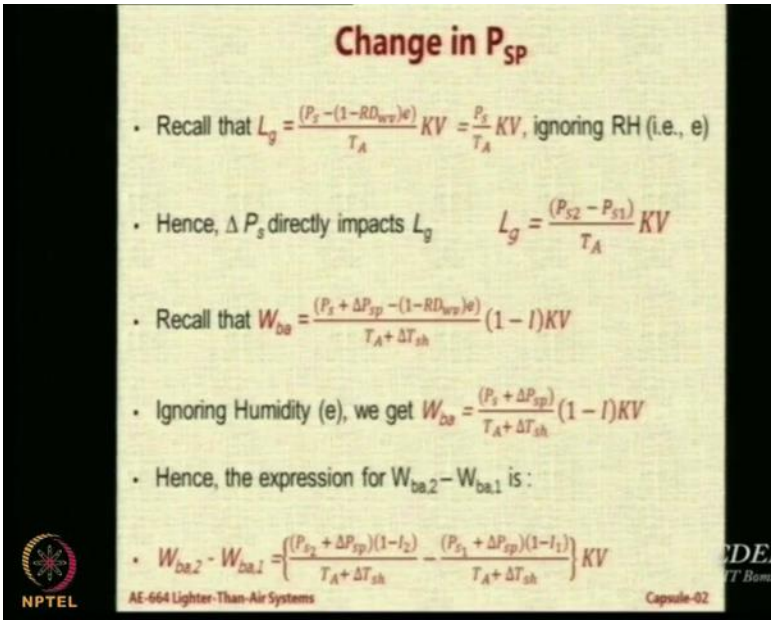

For your use, I show you the expressions so that you can use them. You can use these expressions. In fact, you may also be able to use these expressions. They are the same actually are the same expressions. So now at sea level we have pressure of 101325 and increased by 49 because of superpressure.

What is the answer you get? -35 Newtons and do you get cubic meter as units by finding the volume of weight and then using the density. Now let us go to a situation when you are depressurizing the airship. So now you assume that the P_{SP} is 490 and suddenly it become zero. That mean you have an airship with P_{SP} of 490. Then suddenly it will go down to atmospheric pressure there is a reduction of 490. So, now you take ΔP_{SP} as -490. Actually, you can do it orally, see if it is +49 it was -35 and 2.9.

If it is -490 it will simply be 350 and 29. So if you reduced superpressure very quickly ballonet has to be filled up with more gas ballonet air has to be pushed out.