Introduction to Aircraft Design
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Lecture No – 03
Design Stages

Let us look at the three stages in aircraft design.

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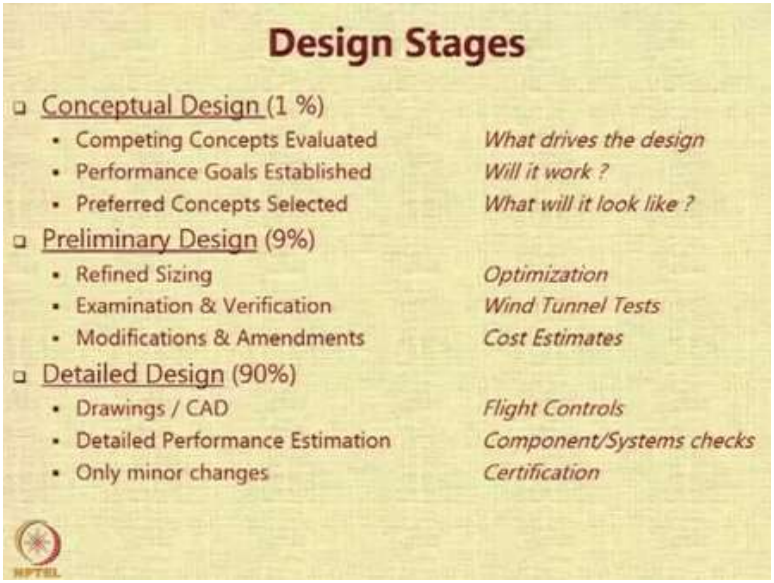

These particular stages are actually the same as what we saw in the previous clip regarding the phases in aircraft design it is just a different way of looking at the same thing. So the first stage of aircraft design is the conceptual design stage which involves only 1% of the total effort involved in aircraft design. In this there are few activities we do, we look at competing concept and we evaluate them.

Because we want to ensure that the requirements that drive the design are understood and appreciated. We establish the performance goals to ensure that these requirements are met and to confirm that the design will work and in the end after a comparative analysis of various computing concepts we shortlist a preferred concept or concepts one or two concepts for future evaluation.

And at this point of time we should have a fairly good idea of what our aircraft will look like? The next stage is the Preliminary Design stage which roughly compasses, encompasses sorry! The next stage is the Preliminary Design stage which roughly encompasses nearly 9% of the total effort and time spent in the design and in this stage we do refined sizing and refine sizing required some optimization little bit of optimization may be needed also in the previous stage, because to arrive at which configuration is the best.

We do need to have some kind of an objective which has to be optimized, so optimization is used also in the previous stage but here it is at a far larger level and then we examine and verify our preferred concept or concepts using detail testing in the Wind Tunnel or structural analysis and we might have to do modifications and amendments in the design that we had taken up essentially to ensure that we are on the right track and the requirements are met.

And also at this place we need to get the detailed cost estimates of our design and then we come to the last stage in our design which is the detailed design stage. Here 90% of the effort is spent in the design process and in this process what we do is we do detail drawings and detailed CAD of various parts that go into the aircraft the various sub-assemblies the various components etcetera, the word component here should not be confused with the word component used earlier for the major assemblies okay?

But and here you look at the details of the flight control system you go for sizing of various components in detail, you again go for the detailed performance estimation and during this process you do that check on the various systems and components and also remember that in this particular stage only minor changes are permitted and now we start looking at what would be the effort involved in certification activity that we will have to undertake.

So summing up one way of looking at the 3 stages in aircraft design, the names are the same Conceptual, Preliminary and Detailed in this particular perspective and it is very important to the students that in our classroom course of aircraft design we might be able to do only about 1% which is the conceptual design stage and may be a small part of the second stage of the

Preliminary design.

It is rarely possible for a classroom environment to deal with detailed design and, the activity in the classroom therefore will be limited only to the conceptual design and a very small part of the Preliminary design, so thank you for your attention we will now move on to the next clip, thank you.