4 MINUTE TALK

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There is different behavior of structural component when the load is being applied to it. There are shearing, bending, buckling and many more but today we are gonna talk about buckling. Buckling is the sudden change of the structural component that is subjected to a load parallel to its longer span. It is usually considered in designing a column but also used in beams. Good thing there is Euler’s equation for critical buckling. It one of the significant formula in Engineering field. We can solve the load that is critical for the column or beam to withstand by the formula Pcr=π^2 EI/l^2. Where Pcr is the critical load, E is the modulus of elasticity of material (if the material is steel or concrete or wood or other material), I is the moment of Inertia of the column or beam and l is the span length. Critical load of buckling unit is N for Si units and lbf for English. We run some experiment on a material to see the extent of this said material in different load and to observe the failure.

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As per the experiment, the top rock is being tested with three different load and it reacts to it. Using an overhead crane large amounts of weight are loaded onto the assembled lift. Starting with a lower weight and increasing to high weight. Again the three loads are 291 lbs, 772 lbs and 1545 lbs. Bending failure is seen so a beta revision for the top rock is highly recommended. Alpha version of the top rock will be upgraded through this.There are three revision that is suggested. Using a different material with a greater modulus of elasticity is one of the revision considered. Another one is thickening the material itself ,cause we all that larger area results to bigger force it can withstand and lastly geometry, changing the shape or length of the top rock might reduce the stress that it absorbed.

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Let us explain deeply this 3 beta revision components. First the Increasing of wall thickness. It may be effective enough to withstand the force however it will be more costly. In designing we have two purpose which is the safety and economy meaning the structure must be safe but it must not be expensive. So we must balance this two so that the beta revision is possible and at the right price. Also thickening the wall will results to heavier material and this is one of the disadvantages of this revision. The second one is same issue with the first. Replacement of material might results to higher price and heavier weight top rock. The material that will replace the top rock must be high in strength but not heavier cause we know that lightweight material is a big advantage in designing. Lastly, the geometry ,it is recommended to cut 2 inches from both ends so that the bending moment is reduced and for me it is the most effective of them all since it will not increase the cost. Though it is not states a circular type of material is much stronger to the rectangular one since it has no weak point and the stress is divided equally to the surface

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As I said earlier, the geometry beta revision is the most effective of them all. First it will not result to additive cost. It is same material. The top rock just reduced in length so that the buckling or bending behavior is lessen. The reduced length of the cantilever beam portion of the lift can have large impacts on how the system handles the load. These beta revisions are being made with a specific scenario of misuse in mind, and are not really necessary for the lift to complete its intended purpose. However, given the dangerous loads associated with the use of this product, this worst case scenario should be used to define the needs of this products design.