

MODIFICATION IN DESIGN OF OVERSPEED GOVERNOR

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Abstract - The main purpose of the project is to provide better modification of design of over speed governor for achieving greater safety compare to current design and also for reducing material used for making the governor. The modification is giving OSG a one more bracket. We have designed, simulate and analyzed the double bracket OSG. Which is giving safer and long-lasting mechanism compare to conventional one. The main focus of this project is to giving design, analysis and simulation of double bracket OSG.

Key words: Design modification in OSG, double bracket.

1. INTRODUCTION

The safety mechanism called the over speed governor is an improved version which uses centrifugal force that causes a system of weight to swing outward towards the real should the carry speed exceed a certain limit, although the travel system has changed little, its control system has been revolutionized.

Generally, an elevator is provided with a safety gear, the tripping of which is caused by the triggering of the over speed governor. The conventional solution is that when the speed of the elevator increases to a limit value set in advance for the over speed governor, the over speed governor trips the safety gear via the same rope as the rope via which the over speed governor monitors the speed of the elevator. Publication US4653612 describes the structure and operation of one such Over speed governor.

A switch, which disconnects the supply current from the elevator motor at a slightly lower speed than the tripping speed of the safety gear, is in connection with the over speed governor. In addition to the elevator gripping in an over speed situation, there are situations in which the safety gear should be able to operate even though the speed of the elevator does not exceed the permitted speed.

These situations include, among others, the testing of the safety gear in connection with an inspection of the elevator or the stopping of the elevator by means of safety gear if the elevator starts to move from a floor level with the doors partly or fully open. The over speed governor is one type of safety device which uses in passenger lift (elevators).

In OSG a main component is pedestal in the middle of

which bracket is assembled and on upper portion pulley is assembled. The pulley and pedestal are assembled by two bearing and one mild steel shaft.

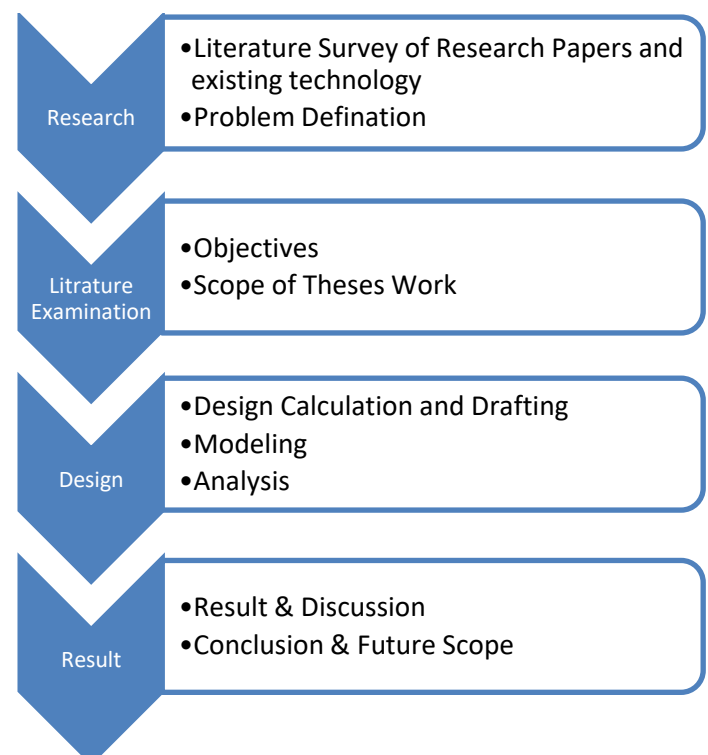
1.1 Principle of Over Speed Governor

A device that mechanically regulates the speed of a machine preventing it from going any faster than a preset velocity.

2. OBJECTIVE

- To increase the life of stoppers.
- To increase the life of OSG.
- To provide two stoppers without changing any other parts.
- Make elevator a safer place.
- To distribute load on two stoppers rather than on single stopper.
- Control the elevator speed by double stopper.

3. METHODOLOGY



4. 2D DESIGN OF DEVICE

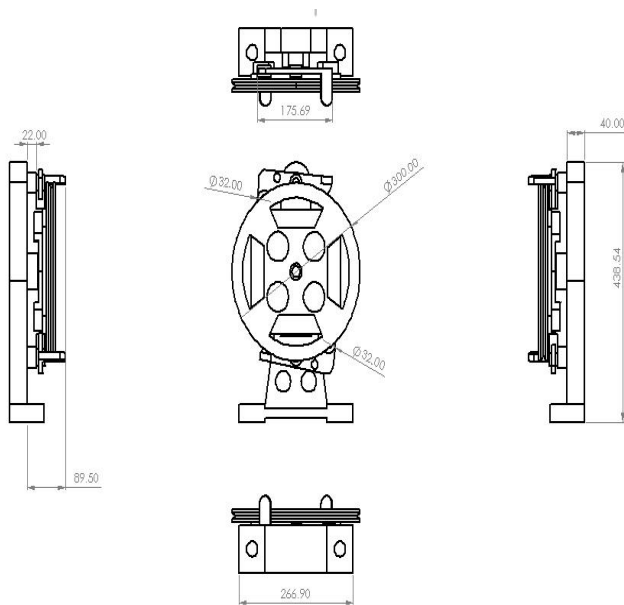


Fig.4- Design of Device

5. 3D DESIGN OF DOUBLE BRACKET OVERSPEED GOVERNOR

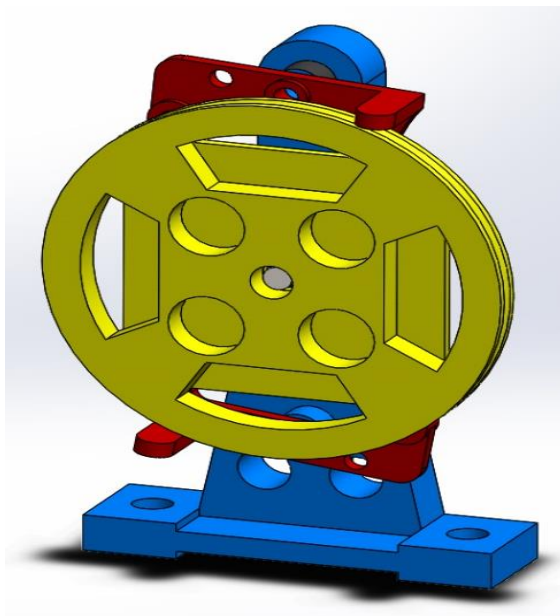


Fig.1(a)

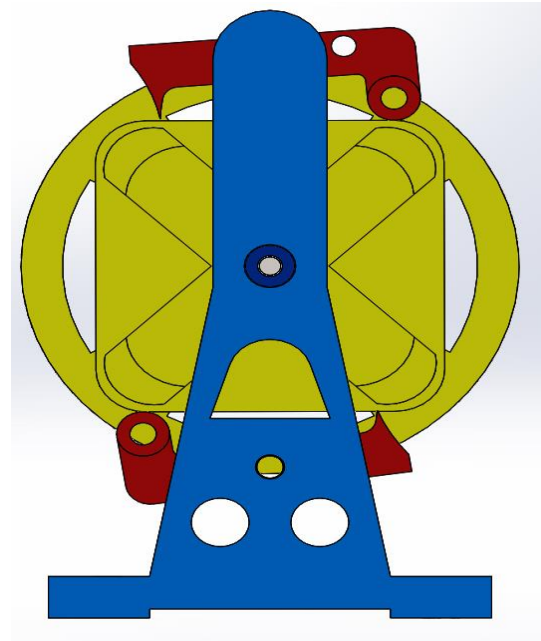


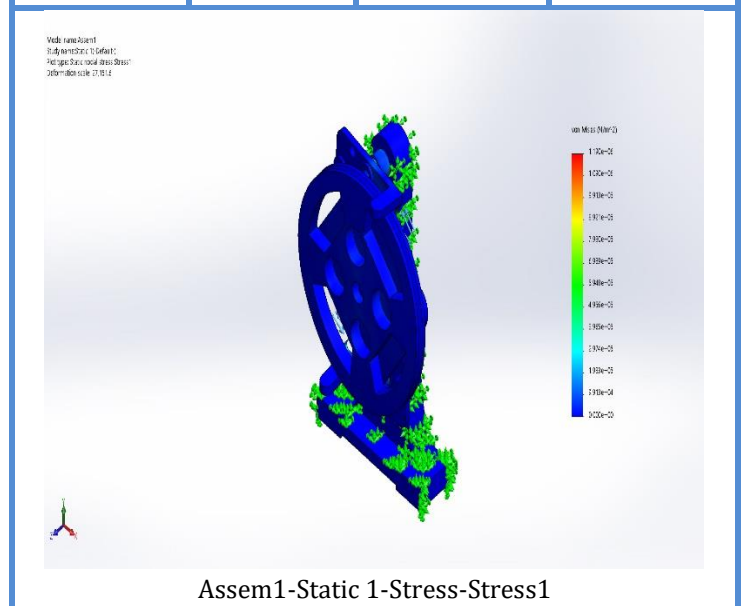
Fig.2- (b)

Fig.5- 3D Design of Double Bracket Overspeed Governor (a) isometric view (b) back view.

6. SIMULATION AND ANALYSIS

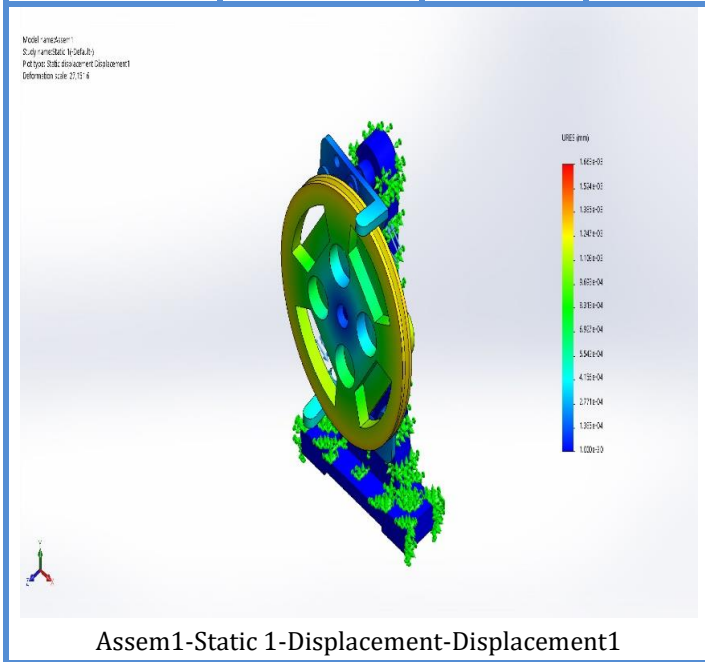
6.1 Stress Analysis

Name	Type	Min	Max
Stress1	VON: von Mises Stress	0.000e+00	1.190e+06
		N/m ²	N/m ²
		Node: 125585	Node: 20242



6.2 displacement Analysis

Name	Type	Min	Max
Displacement1	URES: Resultant Displacement	0.000e+00 mm Node: 25132	1.663e- 03 mm Node: 20111



7. MODIFICATION IN DESIGN

7.1 Conventional Model of Overspeed Governor



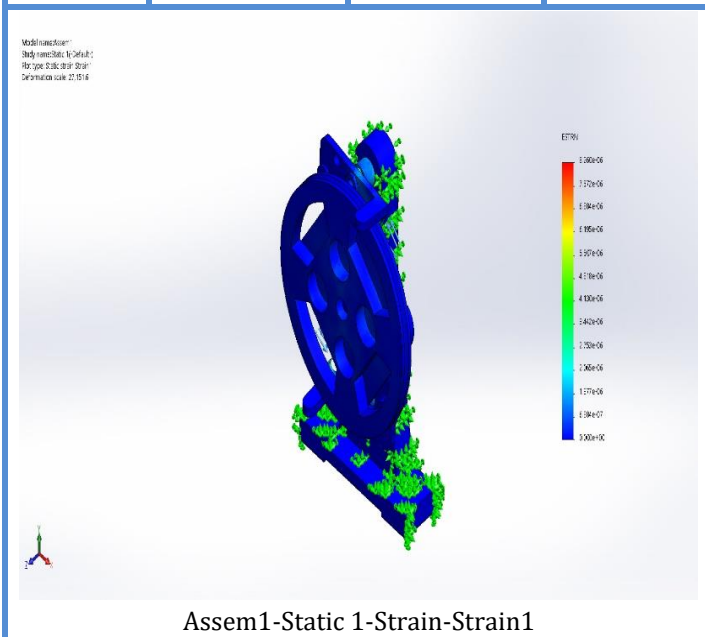
This is the currently use overspeed governor for elevator. Where we can see in the above image that

there is only single bracket for stopping the elevator. All the load and impact of sudden stop is act upon that single stopper.

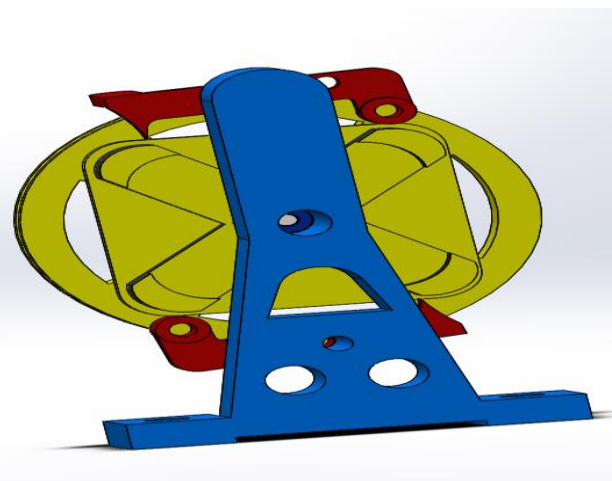
So, we have design double bracket overspeed governor. The load of impact is distributed on both the bracket and no fear of bracket failure. Also, life of bracket is increased so life of overspeed governor is increased.

6.3 Strain Analysis

Name	Type	Min	Max
Strain1	ESTRN: Equivalent Strain	0.000e+00 Element: 77218	8.260e-06 Element: 12951



7.2 Modified 3D Model Snapshot of Overspeed Governor



So, this is the modified design model of overspeed governor. Which has double bracket and more strength to stop the elevator.

In conventional design there is problem related to strength of bracket, life of bracket and system has a one mechanism so always has a fear of failure of bracket or overspeed

governor so of accident fear.

Also design analysis of this model shows a result that the failure of parts by double bracket is not much compare to single bracket. Add on it has safer than conventional one.

8. FEATURES AND ADVANTAGES

- Direction-independent activation in case of over speed.
- Compact design.
- Easy installation and replacement of over speed governor in the system.
- Mounting requires only two screws.
- Can be replaced without loosening the limiter rope.
- Low maintenance.
- Low wear.
- Coordinated components.
- Quiet operation even at high speeds.
- Versatile installation.
- Remote activation.
- Drop protection.
- System for activating additional brakes.

9. PRODUCT SPECIFICATION

PART NAME	MATERIAL	SIZE
Pulley	Cast Iron	300mm x 22mm
Pedestal	Cast Iron	267mm x 25mm x 80mm
Bracket	Cast Iron	188mm x 18mm
Pedestal Pin	Mild Steel	28mm x 98mm
Bracket Pin	Mild Steel	22mm x 70mm
Roller	Rubber	50mm x 12mm
Roller Pin	Mild Steel	19mm x 30mm
Grease Cup	-	-
Stud	Mild Steel	8mm x 126mm

Spring	Mild Steel	-
Spring Pin	Mild Steel	8mm x 45mm
Washer	Mild Steel	45mm x 5mm
Bolt	Mild Steel	3/8 B.S.W
Nuts	Mild Steel	1/2 B.S.W
Bearing	Alloy Steel	35mm x 10mm

10. RESULT

After designing double bracket overspeed governor the main focus is on simulation and analysis of design. The result of simulation and analysis will give us whether this design is possible for production point of view or not.

After all this process we get the result that double bracket overspeed governor is safer, it has a more life, its life cycle is long, its stress and strain produce in parts is closer to the conventional overspeed governor, cost is not much compare to conventional OSG.

Comparison of conventional and double bracket OSG analysis is given above. According to that, the values of stress, strain and displacement of OSG are given and are not much vary compare to each other.

So, we can say that double bracket OSGs design, analysis and simulation gives us result that this modification in the OSG is possible and we can possibly manufacture double bracket OSG.

11. CONCLUSION

We have concluded that available OSG has a single bracket for stopping the elevator. Because of that there are chances of getting failure of single bracket in sudden impact in elevator emergency. Also, we are thinking about increasing brackets life cycle. So, we concluded that if we add one more bracket than it will give us safer, efficient and longer life compare to one bracket OSG.

Our main focus is on designing the double bracket OSG. So, after successfully designing the double bracket OSG. After getting all the data. We can finally conclude that every parameter like dimensions, simulation and analysis are giving trustful results and it is possible to manufacture this type of OSG. Before all this I visited to one industry where one bracket OSG is manufactured and I learnt a lot from that visit. Also, I learn elevators safety, safety gear, maintenance

and how the mechanism of elevator is worked.

So finally, we have concluded that double bracket OSG design is safer, long life and less costly. It is easily manufacture without any effect on another parts of elevator.

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BIOGRAPHIES



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