



ELEVATOR BALANCING BY THE EMPTY CAR METHOD

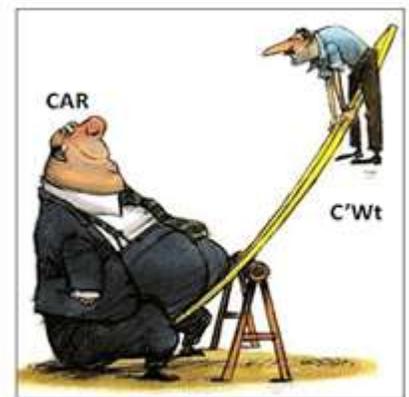
What is Empty Car Balancing?

- Empty Car means the complete car and car-frame, with door-operator and all accessories and interior design elements (e.g. mirror, flooring, fan, COP, false ceiling, etc.) but WITHOUT LOAD. (This includes the fitted compensating chain when demanded by the travel height.)
- Empty Car balancing is the pre-commissioning process of adjusting the weight of the counterweight so that it is equal to the weight of the Empty Car.
- Empty Car = Counterweight (blocks + frame + pulley)
- Assumption: Weight of the Car does not exceed 1.2 x Rated Load (Kg) of the elevator



Why Empty Car Balancing?

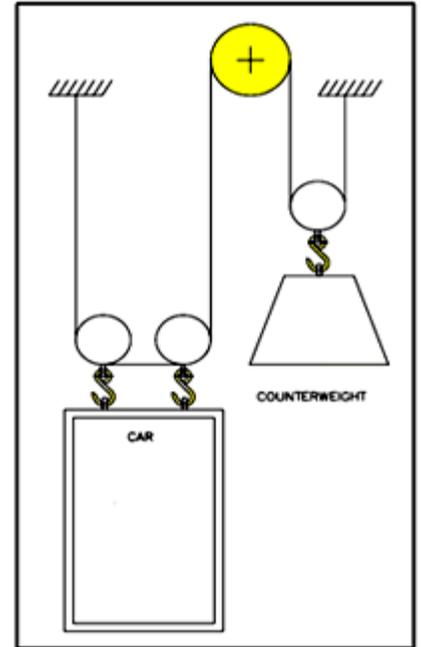
- Proper balancing by this method enables optimization of the counterweight for the rated load.
- Correct balancing – along with low frictional losses via sheaves, guide shoes etc. – improves the shaft efficiency of the installation. High shaft efficiency signifies a good quality installation, and improves energy efficiency.
- Empty Car balancing current should be approximately 10% of the Rated current of the motor in both directions otherwise it will affect the Rated capacity of the motor.



Imbalance

How to do Empty Car Balancing by method of measuring O/P current?

1. Run the Empty Car in Inspection mode continuously in UP direction, from bottom floor to top floor. Note the drive's output Current. (LI.11 for KEB)
2. Run the Empty Car in Inspection mode continuously in DOWN direction, from top floor to bottom floor. Note the drive's output Current. (LI.11 for KEB)
3. Repeat steps 1 and 2 one more time and compute the average of the output currents for UP and DOWN directions.
4. The difference between these readings should be less than 1.0 ampere.
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 - o If the difference is greater than 1.0 Amp in UP direction, then the Car is heavy. Add weight to the Counterweight side, and repeat steps 1 and 2 above until the difference is reduced to below 1.0 Amp.
 - o b) If the difference is greater than 1.0 Amp in DOWN direction, then the Counterweight is heavy. Remove weight from the Counterweight side and repeat steps 1 and 2 above until the difference is reduced to below 1.0 Amp.



(As a general rule, 50 Kg weight will draw 1 Amp Current.)

When a difference of less than 1.0 Amp is achieved, we can conclude that the Empty car is balanced with the Counterweight”.

Finally: add weight to the Counterweight side equivalent to 45 ~ 50 % of the rated load.

This completes the balancing process. The current in “Empty Down” condition should now be close to the rated current of the motor.

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