THE UNIVERSITY OF THE WEST INDIES
AT ST. AUGUSTINE, TRINIDAD AND TOBAGO

CVNG1013 : Introduction to Engineering Mechanics (Semester I- 2017/2018)

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Discussion

Force Vectors

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Force Vectors
by Jovanca Smith - Friday, 8 September 2017, 5:02 AM

If you have a chandelier that is hanging, and a puppy is located under it, and it is about to fall. How will you know if the puppy will be safe?

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Re: Force Vectors

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by Dillon Espinoza - Wednesday, 18 October 2017, 3:38 PM

how will i know?

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Re: Force Vectors
by Kevanee Fagan - Wednesday, 20 September 2017, 1:38 PM

Because the question said that the Chandelier is about to fall and is not falling as yet, it means that the puppy can be safe if it decides to make a sudden change in it's location at the exact time that the chandelier is about to fall. However, to be more technical, I know the puppy will be safe depending on the height /distance and the weight of the chandelier where there would be more of an impact if it falls from a very high height with a heavy weight. I think the puppy will be safer if the asymmetrical chandelier falls on it. The blow would not be as evenly distributed on the pup's entire body like the symmetrical chandelier and therefore would cause less trauma.

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Re: Force Vectors
by Feyaz Mohammed - Thursday, 14 September 2017, 11:29 PM

Considering that there are two options, asymmetrical and symmetrical, it would be initially safe to assume that based on looks that there should be enough space in the asymmetrical chandelier to allow for the puppy to be safe as there is less area that chandelier covers. As well as, the asymmetrical chandelier when falling is less likely to fall directly downwards and instead at an angle as opposed to the symmetrical chandelier which will is more likely to fall more evenly as opposed to at an angle.

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Re: Force Vectors
by Ian Boyce - Thursday, 14 September 2017, 9:13 PM

The dog would not be safe because gravity and the mass of object would be acting in the direction of the dog beneath of it.

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Re: Force Vectors
by Anisha Parsan - Wednesday, 13 September 2017, 11:07 PM

Provided that the puppy is directly under the chandlier the following may occur in the event that the chandlier falls:

With the symmetrical chandlier the force is acting downwards at the

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center. Hence the chandlier will fall directly onto the puppy because the force is the greatest at the centre.(center of gravity)

However the asymmetrical chandlier has different magnitudes of forces acting downwards at the three ends of the chandlier. Hence it may fall to the side where the force acting downwards is the greatest. Therefore the puppy may be safe as it may not directly land to the center.

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Re: Force Vectors
by Davin Deonath - Wednesday, 13 September 2017, 7:59 AM

The puppy will most likely be safer under the asymmetrical chandelier.

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Re: Force Vectors
by Niral Ramlal - Wednesday, 13 September 2017, 7:30 AM

The puppy under the symmetrical chandelier might be safer since the point of contact would all be equally as it hits, however with the asymmetrical chandelier the contact point when it falls might not fall directly on the puppy

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Re: Force Vectors
by Christian Francis - Wednesday, 13 September 2017, 1:58 AM

The puppy is safe because the chandelier is 'about to' fall, it doesn't mean that it did. Until it actually falls the puppy is safe.

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Re: Force Vectors
by Jamarly Toney - Tuesday, 12 September 2017, 7:33 PM

If the chandelier is symmetrical, then the center of gravity would be located in the center of the object and would cause the chandelier to fall vertically downwards. The puppy in this case would not be safe.

If the chandelier is asymmetrical, then the center of gravity more than likely would not be located in the center of the object and would cause the chandelier to veer in any random direction. The puppy in this case might or might not get hurt.

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Re: Force Vectors
by Rehanna Salick - Tuesday, 12 September 2017, 10:29 AM

I don't think the puppy will be safe . However in terms of the design of the structure then for the symmetrical chandelier , because there is an even or equal weight then there wouldn't be parts that are heavier to damage the puppy to a great extent so in a case like that the puppy would be safer rather than with the asymmetrical chandelier the weight is uneven so there will be parts of the chandelier that can cause more harm to the puppy.

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Re: Force Vectors
by Steven Edwards - Tuesday, 12 September 2017, 9:29 AM

You will know if the puppy is safe by the angel at which the chanadeiler falls

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Re: Force Vectors
by Sarah-Marie Garcia - Tuesday, 12 September 2017, 9:28 AM

The puppy would be more safe under the symmetrical chandelier because the weight of the chandelier would be evenly distributed as opposed to the asymmetrical chandelier where a lot of weight may be concentrated in a particular part of it, thus making it more harmful to the puppy.

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Re: Force Vectors
by Vasisht Persad - Monday, 11 September 2017, 10:47 PM

You can tell if the puppy would be safe if you knew the direction and force in which the chandelier is falling.

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Re: Force Vectors
by Liam Smith - Monday, 11 September 2017, 10:14 PM

If there is a horizontal force acting on the chandelier while hanging which is significant enough to push the chandelier away from the area that the puppy is in when it eventually falls the puppy will be safe whether the chandelier is symmetrical or asymmetrical. The horizontal force acting on the chandelier can be said to be a vector quantity as it contains both a magnitude and direction.

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Re: Force Vectors
by Varinder Kalpoo - Monday, 11 September 2017, 6:42 PM

We will know if the puppy will be safe by figuring out the direction in which the chandelier will fall and determining if it will be in range to hit the puppy.

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Re: Force Vectors
by Tia Weekes - Monday, 11 September 2017, 3:27 PM

Either way the puppy will be hit. This is because if it falls it would more than likely fall straight down unless it is pushed by an external force. The only difference would be how hard the chandelier will hit the puppy.

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Re: Force Vectors
by Brent Kokaram - Monday, 11 September 2017, 3:23 PM

I think the information given isn't enough to determine whether the puppy would be safe or not. For example how strong is the chandelier attached to the support or the angle at which the chandelier is located. But since the chandelier is about to drop it would be attracted to the earth. Hence the chandelier would be directed downwards. Logically the puppy would not be safe.

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Re: Force Vectors
by Edward Martindale - Monday, 11 September 2017, 3:06 PM

I think it is determined by the symmetrical or asymmetrical shape because, when an object is symmetrical this gives the object a form of balance (equilibrium). So if the symmetrical object falls from the straight above the puppy it is likely that it will continue in its straight path which will result in the puppy being endangered. If the chandelier is asymmetrical it is possible the puppy's position may be safe. I say this because if one side of the chandelier carries more weight than the other side due to its asymmetrical shape, when the chandelier falls it is likely that it will lean or shift direction and angle in favour of the heavier side of the chandelier. Therefore in the case of an asymmetrical chandelier it is possible that the puppy will be safe. I hope this explanation was easy to understand, I tried my best to explain.

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Re: Force Vectors
by Shaquill Felicien - Monday, 11 September 2017, 1:18 PM

assuming both chandeliers are directly above the puppy as shown in the picture. The symmetrical chandelier will definitely hit the puppy because it will fall at 90, but the assymetrical chandelier will not because it will fall at an angle and by the time it reaches the ground its location wont be parallel with its original position.

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Re: Force Vectors
by Aamir Singh - Sunday, 10 September 2017, 11:08 PM

Due to the effect of gravity on the chandelier it will accelerate towards the earth when falling, from Newton's first law an object in motion will stay in motion with the same speed and direction unless

acted on by an external force. This says that chances are the puppy will be damaged if he is directly under the chandelier. This will happen once no external forces act on the chandelier.

If the chandelier is asymmetrical it could still damage the puppy depending on how asymmetrical it is etc. If it is held by an external force at the top making it asymmetrical and it lets go when falling, then the chandelier will fall in a straight line, if that is the natural shape of the chandelier then it will fall in that same line once no outside forces act on it, either way I think the puppy will be damaged.

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Re: Force Vectors
by Najee Yearwood - Sunday, 10 September 2017, 6:15 PM

In my opinion, the only possibility of the the puppy being safe is if there is horizontal force acting on the chandelier which would cause it to not fall straight down onto the puppy.

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Re: Force Vectors
by Amar Ramlall - Sunday, 10 September 2017, 5:48 PM

Assuming that both the symmetrical and asymmetrical chandeliers are hanging from and fixed point and there is no air resistance; there is a gravitational force acting on the chandeliers with respect to their masses, thus having weight regardless of their shapes. Since these chandeliers have weight, weight will act vertically downwards and the fixed point it is hanging from along with the tension in the "string" will act vertically upwards to obtain equilibrium. In this scenario where as the chandeliers are about to fall with a puppy under it, the puppy will be harmed in both cases because the animal is perpendicularly under the chandeliers which is the path that they will fall,i.e.vertically downwards due to gravity, landing on the puppy.

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Re: Force Vectors
by Vishaal Rajkumar-Singh - Sunday, 10 September 2017, 2:14 PM

The scenario is that a puppy is directly under a chandelier. In the first instance the chandelier is symmetrical and in the other instance, it isn't. when an object falls, it falls in the direction of its centre of gravity as all of its mass is directed there unless a greater external force is applies i.e. a pushing force in which case there will still be a force on the centre of gravity but there will also be another force moving the object away from the original position. So, one would be able to predict that the puppy would be safe under the asymmetrical chandelier, assuming that its centre of gravity is skewed to one side and that there is no external forces acting on it except gravity. Even so, asymmertical chandeliers are balanced so as to ensure that they do not shake while hung. So in actuality you wouldn't know if the puppy will be safe unless there is space directly under where the dog is so that the chandelier falls around him/her.

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Re: Force Vectors

by Saron Franco - Sunday, 10 September 2017, 7:32 AM

Puppy's safety would depend on where the centre of gravity lies on each chandelier.

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Re: Force Vectors
by Vishan Seenath - Sunday, 10 September 2017, 12:32 AM

You win, the chandelier has yet to fall so the puppy is safe.

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Re: Force Vectors
by Vishan Seenath - Sunday, 10 September 2017, 12:30 AM

I am assuming that mass is controlled. However the distribution of the mass is not as the shape can either be symmetrical or asymmetrical. Without being giving a set of values that I can manipulate to determine the path and the point to where the chandelier will fall exactly I cannot definitively say whether or not the puppy is safe or not. Now if I were to assume that the puppy had enough time to react to the chandelier falling the puppy will definitely be safe as it will just run out of the way of the falling chandelier.

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Re: Force Vectors
by Kyle Simmons - Saturday, 9 September 2017, 2:59 PM

you will know if the puppy will be safe when the chandelier falls from the ceiling

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Re: Force Vectors
by Jovanca Smith - Saturday, 9 September 2017, 2:48 PM

OK. Why do you think the direction and angle of fall is determined by symmetrical or asymmetrical shape?

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Re: Force Vectors
by Jovanca Smith - Saturday, 9 September 2017, 2:46 PM

Interesting response. Is it the shape that matters? How are you assuming the shape and mass to be related?

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Re: Force Vectors
by Edward Martindale - Friday, 8 September 2017, 2:43 PM

I would determine whether the puppy will be safe or not by:

1) Determining the direction in which the chandelier will most fall, depending on if it is symmetrical or asymmetrical.

2) Determining the angle at which the chandelier will fall, depending

on whether it is symmetrical or asymmetrical.

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Re: Force Vectors
by Vishan Seenath - Friday, 8 September 2017, 12:12 PM

The center of Gravity of an object is an imaginary point on or off of an object at which the entire weight of the object seems to act. With a symmetrical chandelier the weight is distributed evenly, therefore the center of gravity will be in the center of the chandelier. Thus the chandelier will fall on the puppy unless the chandelier is ring like and there nothing in the center of it. When looking at an asymmetrical chandelier, it is not the same shape all around or does not follow a pattern that would be established in a symmetrical chandelier. This means that weight is not distributed evenly and the Center of Gravity will not be in the center of the chandelier. Hence, the chandelier will not fall directly down but will shift a little towards the side of the Center of gravity.

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