

Dear Sir:

I am writing in response to your request for additional information in Block #3 of the accident reporting form. I put "Poor Planning" as the cause of my accident. You said in your letter that I should explain more fully and I trust that the following details will be sufficient.

I am a bricklayer by trade. On the day of the accident, I was working alone on the roof of a new 30 m tall six story building. When I completed my work, I discovered that I had about 200 kilograms of bricks left over. Rather than carry the bricks down by hand, I decided to lower them in a barrel weighing 20 kg by using a pulley which, fortunately, was attached to the side of the building at the sixth floor.

Securing the rope at ground level, I went up to the roof, swung the barrel out and loaded the bricks into it. Then I went back to the ground and untied the rope holding it tightly to ensure a slow descent of the 220 kg barrel. You will note in Block #11 of the accident reporting form that my weight is 100 kg. Due to my surprise at being jerked off the ground so suddenly, I lost my presence of mind and forgot to let go of the rope. Needless to say, I proceeded at a rather rapid rate up the side of the building.

In the vicinity of the third floor, I met the barrel which was now proceeding in a downward direction at an equally impressive rate of speed. This explains the fractured skull, minor abrasions and broken collarbone, as listed in Section III of the accident reporting form. Slowed only slightly, I continued my rapid ascent, not stopping until the fingers of my right hand were two knuckles deep into the pulley, which I mentioned in paragraph #2 of this correspondence. Fortunately, by this time, I had regained my presence of mind and was able to hold tightly to the rope despite the excruciating pain I was now beginning to experience.

However, at the same time I met the pulley the barrel of bricks hit the ground and tipped over. The result was that some 160 kg of bricks spilt onto the ground. Now devoid of some bricks, the barrel weighed approximately 60 kg. I refer you again to my weight in Block #11. As you might imagine, I began a rapid descent down the side of the building. In the vicinity of the third floor, I met the barrel coming up ... one leg on the outside of the barrel and one on the inside. This accounts for the two fractured ankles, broken tooth, and the severe lacerations of my legs and lower body (not to mention the bruised groin).

The encounter with the barrel seemed to slow it up enough to lessen my injuries when I fell onto the pile of bricks and fortunately only three vertebrae were cracked. Unfortunately, when the barrel hit the pulley at the top of the building, the bottom fell out and the remaining 40 kg of bricks rained down on me which explains the multiple bruises and lacerations on my upper body. I am sorry to report, however, that as I lay there on the pile of bricks in pain, unable to move and watching the empty barrel six stories above me, I again lost my composure and presence of mind and let go of the rope. The barrel then began a rapid descent towards the ground and myself. Fortunately for me I lapsed into unconsciousness. However, the paramedics assure me that this would account for the four cracked ribs, broken nose, and dislocated shoulder mentioned in Section II of the accident form.

Sincerely

J. Atwood, Master Bricklayer



ASSIGNMENT

- {18} 1. For the two situations where the brick-layer and barrel are both in motion (a) draw complete free-body diagrams and (b) determine the acceleration of each and the tension on the rope, assuming friction to be negligible. Remember to use $g = 9.8 \text{ N/kg}$.
- {7} 2. What was the speed of the bricklayer relative to the barrel full of bricks when they met on the first collision. You can assume that one "story" on this building is 5.0 m? Be sure to use relative velocities to prove the speed of the bricklayer relative to the barrel.