

Rana Plaza Collapse Leads to Reform

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Statics - Section B36

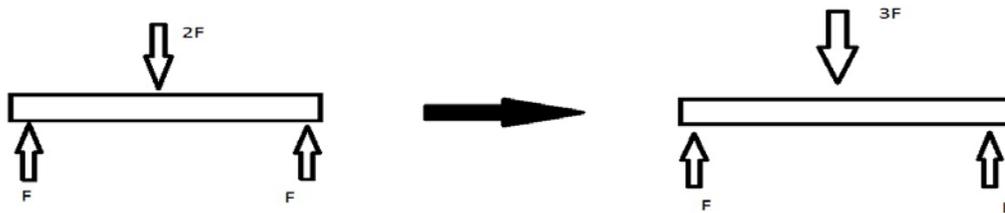
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April 24, 2013. Nearly two years ago one of the worst industrial accidents in recent history took place – the collapse of the Rana Plaza factory building in Bangladesh. For over three weeks cranes were used to remove massive pieces of concrete rubble from the collapsed eight-story building, originally housing five clothing factories. This collapse, and the subsequent whistle-blowing from engineers, had a massive impact on both labor and building code reforms. Several high-ranking officials were fired or imprisoned for giving the green light to a building that was clearly structurally unsound, which led to the death of 1,127 people (Hossain & Alam, May 13, 2013). Not only are there are many implicit ethical connotations to this disaster, there are also many physical faults that can be analyzed in order to prevent mistakes like this in future constructions – a goal that all engineers should share.

The Rana Plaza factory collapsed for several reasons. One of the more obvious reasons for the collapse was that the building owner illegally added several floors to the structure, which were blatant violations of the building code in the area. Another cause of the building collapse was the installation of heavy machinery, also not to code, that the structure was not designed to support (Hossain & Alam, May 2, 2013). All this additional weight added downward force on the structure, without the addition of any upward forces such as load-bearing columns. A building should be in equilibrium in order to remain standing – all the forces acting on the structure should equal zero. That means all the forces in the vertical direction need to balance, and all the forces in the horizontal direction need to balance in order for the building to stay in equilibrium. As seen in Figure 1, these additional forces downward would throw off the equilibrium of the structure, causing it to move. In this case, that movement was seen in the formation of cracks in the structure. When the buildings' power failed about 15 minutes prior to the collapse, its heavy generators kicked on. The vibrations from these generators caused the

cracks, which had been investigated and ignored by government officials the day prior, to expand and resulted in the structural failure of the building (Hossain & Alam, May 2, 2013).



**Figure 1:** Upsetting structural equilibrium of Rana Plaza.

Government officials, upon investigation of the structure post-collapse, also concluded that the materials - such as rods, bricks, concrete, and other load-bearing parts of the structure - were substandard (Hossain & Alam, May 2, 2013). This was another major factor that allowed Rana Plaza to collapse with such ease and in such a short time frame – slightly more expensive materials could have handled more stress without breaking, and the workers may have had more time to evacuate. Ultimately the result would have been the same with the addition of the upper levels and heavy machines, but perhaps at the expense of fewer lives.

This tragic accident had far-reaching results. Over a thousand deaths in such a short span cannot be ignored, and as a result reform began in Bangladesh. Engineer Abdul Khan appeared on television the day after the accident, claiming he told the owner of the building, as well as several government engineers, that the building should have been investigated further and that he should have evacuated his workers. However, witnesses claimed that Sohel Rana, the owner of the Rana Plaza, stood outside and told his employees that the building was safe the morning before the collapse. According to Hossain and Alan, however, it is not just the owner at fault (Hossain & Alam, May 13, 2013). The mayor of Savar was also suspended, along with his right-

hand man, for giving the building plans the green light, as well as ignoring the cracks that had been investigated the day before the collapse (May 13, 2013).

Some argue that the punishment for all those involved was not severe enough. Rana, the owner, only had to deal with the threat of seven years in prison even though it was his property and decision to use cheap materials that contributed to the death of 1,127 people. Suspension was also arguably not enough for the two government officials that ignored the obvious structural issues with Rana's factory (Hossain & Alam, May 13, 2013). The engineers that ignored Khan's alleged warnings are probably the most at fault. Any engineer should know the implications behind the use of cheap, nonstandard materials in the construction of such a large structure. Not only that, but to ignore very obvious signs of the structure failing, as well as direct warning of these failures, is immoral and unethical according to the NSPE Code of Ethics for Engineers, whose primary canon is to "hold paramount the safety, wealth, and welfare of the public" (NSPE Code of Ethics for Engineers). Moving forward, in order to prevent disasters such as the Rana Plaza collapse in the future, reform is necessary. Reform in Bangladesh has already begun, with stricter, more enforced building codes being set into place (Hossain & Alam, May 2, 2013). With these new codes put into effect, the safety and welfare of the public will be at much lower risk, which will be a solid start to the change that Bangladesh needs so badly.

### References

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