

TROY BRIDGE EXCAVATOR INCIDENT

In the 2012 thriller Skyfall, James Bond played by actor Daniel Craig, is seen operating and performing stunts in a Caterpillar 320D Excavator, while it is being transported at high speed on a flatcar wagon on a train. <https://www.youtube.com/watch?v=gmCA6L5K1Yo&t=33s>. We can forgive Bond for not doing all of the things we expect equipment operators to do prior to and during the operation of an excavator as this is make belief. But in the real world and in the parish of Trelawny on July 23, there was an incident that was almost as dramatic as that in the Bond movie.



Figure 1. Location of Troy in Trelawny. Circle indicates collapsed bridge

A contract was recently awarded for the reconstruction of a new bridge to replace the old bridge across the Hectors River, which partially collapsed in 2021. The old bridge which was originally constructed in 1869, is described as a “Barrel Arch.” Details of the Contractor and the construction team were not provided in the news reports. Photos of sections of the old bridge are below.



Figure 2. Images of the remnants of the bridge.

Far removed from Troy, I am making two assumptions. They first is that the initial project work was the demolition of the existing structure, removal of the debris and generally cleaning and preparing the site for the new construction activities. The second is that for the demolition of the old bridge, the contractor had a number of options including:

- A. Making and access road to the river bed (will be required in any case) and use an excavator from there to demolish the structure. The excavator on site had a maximum reach of 10.25m at 6.5m beyond the track and could demolish the structure with very little risk of material falling back on the unit.
- B. Putting the excavator on top of the partially collapsed structure and working from there to demolish the remains.

The particular excavator, the JCB JS220 is a large machine and is about the same size as the one featured in Skyfall. It has the following specifications:

L: 31.4 ft
W: 9.8 ft
Operating weight: 48,290 lbs.

The result of the excavator going onto the compromised bridge structure was predictable. The bridge collapsed and the excavator fell into the river.



Figure 4. Sequence of the collapse of the arch and the excavator falling into the river. In image 3, the operator is trying to stabilize the unit using the bucket, however this is futile.

Fortunately for the operator, it fell on the right side. Had it fallen on the left (cab) side, the results could have been different. The operator could have been:

- ejected from the machine which could possibly have fallen on him
- trapped in the machine and if the cab was submerged, could have suffered drowning.

The excavator was recovered days after the incident. A road to the riverbed was required to get the some of the recovery equipment to the excavator.

One interesting aspect of this case, is the perception of the cause of the incident, by some citizens of the area. They are convinced that the incident occurred because of the absence of a blood sacrifice prior to the commencement of the job. This is a quotation from a

Jamaica Observer news report.

The residents of the area mentioned that on Tuesday afternoon, the excavator was being used to demolish the remaining section of the bridge when the structure collapsed, causing the unit to overturn into the river. The concern over the same has been raised by the residents as they have claimed that the folklore-like slaughtering of a goat or chicken and the shedding of its blood was not done before the demolition work commenced.

What are some of the lessons that we can learn from this incident?

1. A proper hazard assessment must be done prior to starting work with machinery on any site. This must take into account ground (and in this case bridge structure) conditions, and specification of the equipment.
2. Expect the expected. An old compromised bridge cannot support the weight of a 24 ton excavator. No amount of gentleness of operation would have made a difference.
3. Work must be supervised by competent persons. The video suggest an operator operating alone.
4. The operator must be trained in emergency operating procedures. If the machine had toppled on his side (left), the entry door would have been stuck in the river bed.

There is no exit through the right side of the machine so the operator’s only escape routes would be through the front glass, the rear glass or the skylight on top of the cab. These would not be popping open as easy as in the Caterpillar unit in the movie, so unless the operator is prepared with a device to assist with damaging the rubber seal to allow the glass to be removed, he could well be trapped and unable to help himself to leave the cab.

5. Don’t’ be misled by the residents. No amount of blood and white white rum, would have had any mitigating effect and would have prevented the accident, given all of the Safety and Supervisory lapses indicated by the video. The full video is at: <https://www.youtube.com/watch?v=ZGaXT7Tg0C0>.

Disclaimer. I have not been on site at Troy and all of my information is from media reports and imagery.