MIRROR FALL MAY BE DOWN TO THE WIRES

A near fatal accident occurred in Hong Kong Coliseum a fortnight ago, when a moving frame holding a video screen fell on to the show stage, injuring two backup dancers.

I would call such an unfortunate event an incident and not an accident, as most accidents are caused by human errors.

One suspension wire reportedly snapped and the other wire did not seem to be able to hold on to the frame.

Initial investigative findings point to metal fatigue of the suspension wire, but my guess is that the root cause of the incident is likely a combination of design and operational defects.

Let us examine the suspension method of the video monitor frame. It is reportedly a flat structure containing a video screen, which can move up and down and can be rotated, apparently to give the audience a new experience in audiovisual enjoyment on top of the live concert, adding extra viewing angles not usually seen from where fans are seated.

The frame was reportedly about four meters tall by four meters wide, but rather slender and weighs about 500 kilograms. It was suspended with two steel wire ropes that not only supported the weight of the frame but also provided the means to enable vertical and rotational motion.

It would be simple and easy to calculate the strength of the steel wire cables required to support the metal frame when static with allowances for the necessary safety factor, but when the frame rotates, the forces imposed on the cables increase, especially when the slender frame would be subject to wind forces and inertia.

In the theory of mechanics, a flat structure can be stably suspended at one or two points, but when it is caused to rotate, it will become unstable as the flat surface will attract wind forces that will easily be multiples of the static load.

With inertia forces, such loads will further increase if it is allowed to move up and down at the same time as it is rotated.

Objects, to be stable, need , as is well known, to be secured to three points, thus a three-legged stool is the minimum support for maintaining stability for a three-dimensional object.

Lifting devices for industrial operation are governed by Labour Department regulations that ensure they are constructed and operated by competent persons, with comprehensive testing procedures.

However, for stage performances, the ordinance does not specifically cover them as it is not an industrial application.

Furthermore, the actual movements of the wire winches are under manual control and thus heavily rely on the experience of the operator not to exceed the design parameters.

It will be for the investigation team to inspect whether such design parameters had been breached, but the fact that the wire ropes suspending the frame had failed shows this could be a likely cause.

Hopefully, this incident will serve as a reminder to those in charge of show business to pay more attention to safety, especially with heavy devices hung above, and with movable platforms on stage.

We must not allow what was meant to be amusement and relaxation for viewers to become a nightmare, as safety must be ensured at all times for everyone.

Veteran engineer Edmund Leung Kwong-ho casts an expert eye over features of modern life