Safety Warning Notice No 1

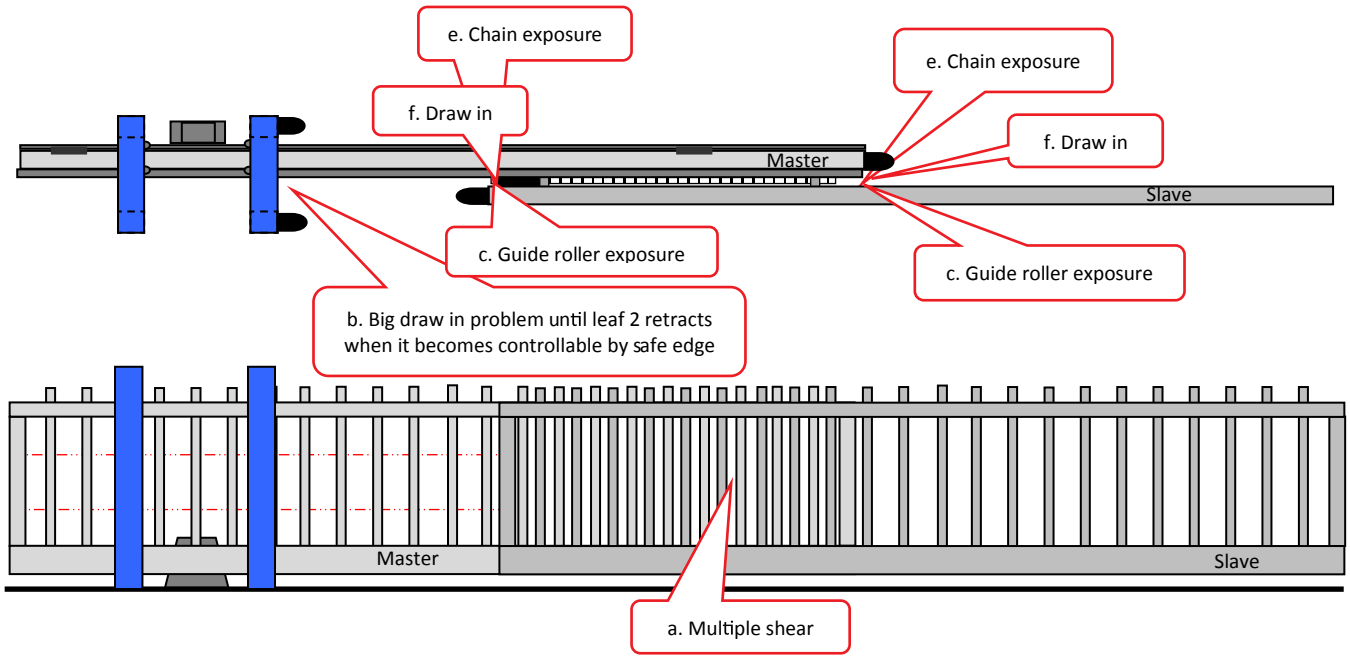
Telescopic sliding gate safety

An incident associated with a telescopic sliding gate has revealed some areas of concern particular to this format of gate. This document attempts to highlight some of these hazards and offer some possible control measures. It is not intended to dictate ultimate design and many more solutions than those described here are possible, depending on individual designs.

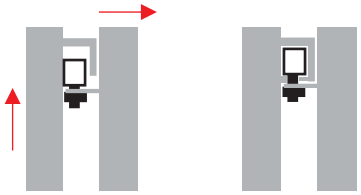
As with any gate system, you should consider not only normal use but also foreseeable misuse by users and the likely effects of system faults. Failure of any one component should not lead to a hazardous situation. Ultimately, you should be thinking not so much what is the minimum required for compliance, but what will produce a safe system in use?

A Multiple shear hazards can exist as the leaf infill of slave and master leaves pass each other. A possible solution could be a fine mesh infill for (e.g. 358 prison mesh) to the outer face of both leaves. An acceptable safe clearance for 358 prison mesh is 100 mm between mesh and hazard, hence mesh on the inner faces could still result in a hazard to children's fingers.

B A big draw in hazard can become exposed when the slave leaf has exited the support frame to close and becomes a bigger issue when the gate begins to open. The draw in could initially happen against the master leaf and then lead to entrapment when the slave leaf re-enters the support frames. This is a further complication of a hazard already subject to an HSE warning WG 2013.08 (page 3). Probable solutions could be moving light beams on the slave leaf facing back into the support frame or use of photo scanner or light curtain across the entire opening.



C Guide roller exposure can lead to finger traps as with conventional sliding gates but is exemplified because the guide channel and rollers between master and slave leaf are more exposed and move with the leaves. The solution could be local guard or enclosure of channel, see drawing below.



D An overturn risk is far more likely in many designs because the slave leaf has left the support frames and any minor fabrication failure, loss of a roller, minor lifting of the master leaf due to track obstacle or impact can lead to loss of support and catastrophic overturn of the slave leaf; probable solutions are many but could be as simple as making the guide channel slotted on its underside (see previous page), thus captivating the roller. This configuration will still be vulnerable to fixing failure and hence should be subject to lock wire, lock nuts or split pins in conjunction with increased maintenance checks to ensure rollers and fixing bolts remain secure.

E The transmission system between master and slave leaf can produce draw in, crush hazards as some configurations can leave the transmission exposed; a probable solution could be local guarding.

F The usual draw in hazards between support frame and moving leaf exist as with a conventional gate but additional hazards exist between the leaves. A probable solution will be to keep the safe edges as close as possible to the moving leaf; 100mm is usually too much. As with b, HSE warning WG 2013.08 refers (page 3).

G As the slave leaf travels further than the master leaf and, depending on the transmission system employed, is often moving at double the master leaf speed, this coupled with transmission losses and any slack in the system can give these systems a poor reaction to safe edge activation. This will produce high impact forces and poor reaction times to safe edge activation. Selection of the correct safe edge profile will take particular care and will need testing to ensure that force and reaction have been adequately controlled. Any slack that develops in the transmission will see considerable drop in safety response times and hence additional, more frequent maintenance will be required to keep the system safe. Safe edge specification for fixed and moving safe edges is equally important as the fixed edges will need to control the leaves at full speed mid stroke, not just at the end of travel.

H Both leaves need effective emergency travel stops in both directions, as ever. The stop is there to prevent a leaf becoming disengaged in the event of a system fault (e.g. limit switch failure) and needs to be strong enough to withstand the maximum inertia of the moving leaf combined with the full force of the drive unit. **dhf** recommends 3.5 x calculated load but, in any case, we are looking for considerable over engineering. Beware, these stops are needed not just at the terminal positions but also leaf to leaf in the open position.

Telescopic sliding gates present more complex issues than conventional designs and hence hazard control and maintenance are more complex as a result.

These systems probably make a better than usual case for using cutting edge safety systems such as laser scanner and light curtain technology.

Please make sure that when installing, repairing or maintaining telescopic gate systems all possible hazards have been identified and adequately controlled. If you are unsure about the safety of a given system, seek the assistance of someone who does have experience of this type of system.

Directive 2006/42/EC
Machinery Working Group
Doc.WG-2013.08

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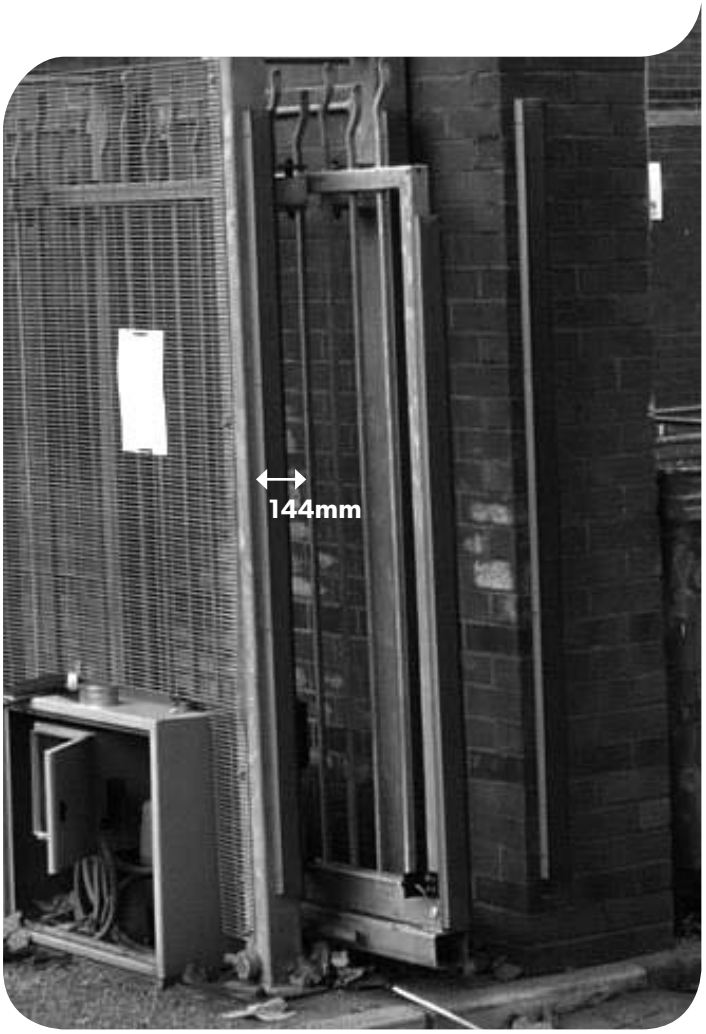
Sliding Powered Gates: Avoiding a shear gap & drawing-in risk

In late 2012 at a residential site in the UK a young child who was riding on a powered gate was carried into the gap between the gate leaf and a supporting pillar, becoming trapped and sustaining serious internal injuries which required surgery.

The child was small enough to be carried through the 144 mm wide gap between the vertical bars of the 6m long x 2m high (approx.) gate leaf and the support pillar. The safety edge fitted on the support pillar failed to prevent this.



Comment

The safety edges fitted on the support columns were not best positioned to avoid the foreseeable risk from drawing-in and whole body access between the moving gate leaf and stationary parts **(Note: the forces exerted by the gate in both the closing and opening directions gave results less than those specified in the current published standard EN 12453: 2000).**

Standard

EN 12453: 2000 Industrial, commercial and garage doors and gates: Safety in use of power operated doors gives safety requirements for powered gates. Clauses 5.1.1.5.3 and 5.1.1.5.4 deal with the safeguarding of shearing and drawing-in points, specifying requirements for a minimum distance between passing edges of 25 mm (or rounded edges), in addition to limitation of forces at secondary edges, with a warning that "Drawing-in points cannot normally be safeguarded by limitation of forces only." But the hazard of whole (child) body access is not currently recognised.

A formal objection has already been made (WG 2012.55) and the standard is currently being revised by CEN TC33/WG5/TG4. It is anticipated that the revised standard will fully take this issue into account.

Action

Gate designers, maintainers and owners need to be able to recognise and avoid this risk of potentially serious or fatal injury from whole body access. In the interests of public safety member states authorities responsible for market surveillance and the enforcement of safety/ maintenance for powered gates, are asked to consider passing this information on, particularly to those working in the powered gate industry.

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