

## **Assessing cradle and suspended access equipment loads**

*This Technical Note considers the impact loads that may be imposed on a façade by an access cradle or other suspended access equipment. A method of calculation is given.*

*Impact energies in the range 300 - 1000 Nm are shown to be possible but these will be distributed over two or more points of contact. A plane curtain wall of glass and aluminium stick may be able to withstand these impacts. However, walls with fins and similar projections will be prone to damage unless appropriate measures are taken.*

*This Technical Note should be read in conjunction with:*

*TN 97 Selection of access equipment for façade maintenance*

### **Introduction**

The use of cradles and other suspended equipment to access the building envelope gives rise to potential impacts on the building envelope. This has implications for both the safety and serviceability of the building envelope.

It should be noted that other forms of access also have safety and serviceability implications. An overview of all methods of access is given in TN 97.

Impact of cradles on the building envelope is sometimes avoided by using guide rails to restrain the cradle movement.

Impact forces caused by cradles can be reduced by using energy absorbing rollers or mounting the rollers on an energy absorbing component. The impact forces also depend on the size and number of buffers.

### **Causes of impact**

Cradle impact against the building envelope may be caused by:

- Wind
- Pushing away
- Collision while manoeuvring

### **Wind effects**

The cradle may be pulled away from or blown against the envelope. The greatest impact forces are associated with the cradle being pulled away from the wall by a gust of wind and then swinging back against the wall as the gust subsides. This is mostly likely to occur near a corner on the leeward wall.

The impact forces are related to:

- The wind speed
- The mass of the cradle
- The area of the cradle
- The suspension length
- The ratio of mass to area of the cradle
- Energy absorption in the rollers and roller mountings
- Number of rollers and contact area.

### **Pushing away**

The cradle may be pushed away from the building envelope by the operatives working in it and then swing back to impact the envelope. The forces moving the cradle are limited by the capacity of the operatives and the movement is limited by the reach of the operatives. Impacts caused in this way are almost always of lower magnitude than those caused by cradle impacts resulting from the wind.