

## CHALCOTS WORKS GROUP WINDOW OPTIONS QUESTIONS 20/11/2018

- 1. What problems, safety issues and failure rates are known by manufacturers and installers regarding both top-hung tilt outwards and tilt and turn inwards windows? (The latest available in the market).**

Camden approached a leading supplier of windows. They said that all window products are put through 'cycle testing' which means they are opened and closed for 20,000 repetitive 'cycles' which is roughly how many times a window would be opened and closed in its lifetime. Only a small number of window failures have been reported to the supplier's UK and European projects, and all of these have been on open outwards window products. The reasons are mixed; some are deliberate damage, some accidental damage and some through incorrect manufacturing. When windows have fallen from a building, they have all been open outwards windows and the supplier is not aware of an instance when open inwards windows have failed like this.

- 2. Which window type has more maintenance issues and why?**

Outward opening windows can need more frequent maintenance because of the risk of damage when left open in high winds. The other issue to consider is that outward opening windows can require maintenance from the outside, depending on the fault, which requires high level access. Windows that open inwards can be repaired from inside the dwelling should an issue occur.

The tilt and turn window is more complex in that it has two functions rather than one, but overall it is not considered to be maintenance intensive.

Any detailed inspection requirements or maintenance regime for the window that is selected would need to be confirmed with the supplier once detailed design has been completed.

- 3. Will it be possible for the mechanism in tilt and turn inwards windows to jam half way through changing into the other position?**

A good quality window system should not jam and it can be included as a requirement in the specifications that this does not happen. For example, manufacturers can incorporate a 'mishandling device' to prevent the window from being placed into the tilt and turn modes at the same time. Although not impossible, this device makes it very difficult to put the window in both modes.

- 4. Are there any regulations that state top-hung tilt outwards and tilt and turn inwards windows cannot be used in high rise tower blocks?**

No, there are no building regulations that govern the type of windows used in high rise tower blocks. Building regulations only relate to 'guarding' heights – this is the height of the bottom of the opening section of the window from the floor.

However, there are safety in design regulations that need to be followed. They require that all reasonable steps are taken to avoid or reduce risks, especially risks with a potentially severe outcome. An outward opening window creates an additional risk that an inward opening window doesn't – that it could fail in high winds – so it could be argued that outward opening windows are an avoidable risk that can be mitigated by using inward opening windows.

## **5. What are the known problems in Camden on tilt and turn inwards windows? How are these windows failing?**

There are seven tilt and turn inward window installations in Camden owned high rise blocks:

1-120, BACTON, Haverstock Road, NW5 4PU  
1-44, ENGLEFIELD, Clarence Gardens, NW1 3LN  
1-44, SWALLOWFIELD, Munster Square, NW1 3PJ  
1-50, MONMOUTH HOUSE, Raglan Street, NW5 3BX  
1-64, HARDINGTON, Belmont Street, NW1 8HN  
1-50, 8 NEWTON STREET, WC2B 5EG  
XY AIR (MAIDEN LANE TOWER), Maiden Lane, NW1 9YN

These windows will differ in their specification, design and operation, so do not necessarily offer a direct comparator to the windows being considered under tilt and turn inward opening windows for Chalcots Estate.

Most of these windows have been in place for a number of years. The most common repair item being the 'drive gear lock'. The windows have restrictors fitted on the turn option; on the older installations these have been replaced as required using a secure, key operated 'jack lock' cable.

Bacton Tower is a more recent installation. The transition from tilt to turn is via the key operated handle and there are restrictor catches fitted.

Maiden Lane tower has recently been completed and has tilt and turn windows fitted. It has two physical restrictors on the turn function and requires the handle, which is key operated, to be in the correct position.

Overall, Camden's carpenters advise that the tilt and turn windows that have been installed can be repaired easily. It is important however for new installations that parts availability is ensured. In terms of repair frequency, window repairs at these blocks are at comparable levels to blocks of a similar archetype.

## **6. Can top-hung tilt outwards windows be secured in such a way to make them even safer within their frame?**

The technical design team advise that frames and other parts of the window could be reinforced to make them safer in case they are left open in high winds, but this would need to be part of a bespoke system. It would potentially increase the weight of the frame and thereby its ease of use. Custom windows would have to be designed, tested and manufactured, which would increase the timelines for the next stage of the programme of works.

As set out in the technical report, metal cables can be used to secure the opening frame to the fixed frame to reduce the risk of a window falling. This added mitigation is also taken into account as part of the risk assessment.

## **7. Would an improved restrictor limit risks further, for both options without negatively impacting other resident needs?**

The type of restrictor for the replacement windows has not been decided yet. A reinforced restrictor could limit the risk of somebody tampering with the mechanism. As part of the detailed design process we will continue to look at the type of window restrictors to be used, to make sure that we have the safest restrictors for the Chalcots Estate while still allowing residents to open their windows.

There will be an option to open the window past the restrictor to the full purge position with a bespoke tool. This would be looked at as part of the detailed design process.

**8. In the technical report, was overheating against top-hung tilt outwards windows assessed with or without the cladding on the blocks?**

Both the top-hung tilt outwards and the tilt and turn inwards options were assessed with the improved cladding which is due to be installed. The top-hung tilt outwards window option was also assessed with the original cladding. An assessment wasn't carried out without the cladding on the building for either window.

**9. How was the weather system specific to the area around the blocks taken into account in the technical report for both options? This would include wind (slamming), rain (entering property) and sunshine (glare and glazing). Was the difference between the sides of the blocks taken into account?**

There is no evidence available to say that Chalcots Estate tower blocks have different weather systems compared to similar tower blocks in Camden.

**Wind:** There is no data available to show that the wind environment around the Chalcots towers is different to any other set of high rise towers once the shape and size of the towers is taken into account. Winds typically cause a 'down draft' when they hit against the face of high rise buildings, which could cause windows to slam shut and potentially damage them. Both window option types would have anti-slam functions and 'friction stay' window hinges that provide resistance to reduce the risk of windows slamming shut.

**Rain:** The buildings are quite uniform so it's unlikely that rain would impact on the Chalcots towers in a different way to other tower blocks. The top-hung tilt outwards and tilt and turn inwards window options are similar in terms of the risk of letting in rain and the only way to stop rain coming in through an open window is to close it. Both options will have trickle vents which will let in a small amount of fresh air on rainy days without letting rain in.

**Sunshine:** The sun shining through a window heats up the room inside, and the amount of sun a room gets depends on the way the window faces. Rooms facing south or west will overheat more easily than rooms facing north or east as set out below.

- South: The south facing side receives the most heat from the sun.
- West: West facing side receives less glare as the sun is lower in the sky. As outside temperatures rise during the day the west facing sides of the block are particularly vulnerable to overheating as higher outside temperatures add to the heat from the sun.
- North: The north facing side has very little or no heat from the sun depending on the season.
- East: The east facing side receives a similar amount of heat from the sun as the west side. However as morning temperatures tend to be lower the build-up of heat from the sun and outside temperature is not as pronounced as on the west side.

This has been taken into account in the technical report for the Chalcots Estate tower blocks.

**10. Can we outline the dangers to resident safety within flats specific to the Chalcots as part of the technical report?**

The main risks considered as part of the technical report were keeping people inside safe, letting in fresh air and keeping people outside safe. In the assessment criteria of the technical report, these fell under resident safety, purge ventilation and public safety. The technical report looked at these

options in relation to the window designs and gave a technical assessment to explain how the window options performed against these three categories.

**11. What windows were used in Grenfell and Lakamal House tower blocks? Did the window type have an impact on the spread of fire?**

Tilt and turn inwards windows were used in Grenfell Tower and Lakamal House. The type of window was not a factor that is considered relevant to the impact on the spread of fire for either property as outlined below:

- The reasons for the rapid spread of fire across the facade at Grenfell Tower is the subject of an ongoing public inquiry. However, the evidence provided to the inquiry that is available to date indicates that the type of cladding, PVC window frames and the gaps between the window frame and concrete were likely to have contributed to the fire spreading. Camden will not be installing PVC frames.
- Although references were made to the windows and associated panelling at Lakamal House, for example gaps around the windows allowing the wind to push smoke back into the flats, the Coroner’s reports primarily refer to compartmentation failures within the building.

**12. Which window type is used the most for high rise tower blocks and why? (UK and worldwide)**

Tilt and turn inwards windows are the type of window most commonly used in recent residential high rise projects in the UK and Europe. This is for the following reasons:

- Safety. There is a lower risk of windows being damaged by wind and a much lower risk of window parts falling from the building if damaged.
- Flexibility. This type of window has two ways of opening and means more choice for users letting in air.
- Maintenance. Windows can be cleaned from the inside.

Recent high rise blocks, of 9 storeys and above, in London with tilt and turn inwards windows include:

Kensington Row	Riverlight, Vauxhall
Lillie Square Development	Royal Arsenal Riverside, Woolwich
London Dock, Blocks A & B	Tiger Way, Hackney
Prince of Wales Drive, Battersea	White City, Phase 1 (>22 storeys)
Principle Place, Buildings 3, 4 and 5 (20+ storeys)	Wood Warf Development, Canary Wharf

**13. Confirm the number of cases of window failure across the five Chalcots blocks and why they failed.**

The logged significant window failures of the windows on Chalcots Estate are:

	<b>Block</b>	<b>When</b>	<b>Why</b>
1	Dorney	October 2013	Window fell out in St Jude’s Day storm
2	Taplow	December 2013	Window fell out during exceptionally strong winds
3	Blashford	February 2017	Window fell out in high winds from storm Doris
4	Blashford	December 2017	Window fell out in high winds from storm Bruno
5	Dorney	January 2018	Window hinges damaged by winds
6	Dorney	January 2018	Window hinges damaged by winds
7	Dorney	March 2018	Window hinges damaged by winds

#### **14. When would a resident need to use the purge function for the tilt and turn inwards windows?**

The 'purge' setting option on the tilt and turn inwards window, which allows the window to be opened fully, is optional and is to be used to quickly let in air in extreme circumstances. As such, we do not expect this option to be used very often, for example, to air a room after it has been painted or in a heat wave. In less extreme circumstances you may wish to open your window to 30cm on the restrictor instead to ventilate your flat – it will just take longer to ventilate than the purge setting.

#### **15. Who will get the special tool to fully open to purge and how will this be managed considering known behaviour of certain residents – i.e. leaning out or throwing items out?**

All residents will be offered the option to have a tool to open their windows fully in the purge position but may choose not to have the tool or use it. We will work with residents to make sure they understand whether they feel they need a tool and how to use it safely if they do.

Camden will investigate all reports of residents throwing items out of windows and takes this and all other antisocial behaviour very seriously.

#### **16. How and why were the criteria for the technical report and the risk assessment chosen and weighted?**

The technical report evaluation criteria were established in consultation with Camden to identify the most suitable window type for the Chalcots estate. The criteria reflect the basic functions that a window should provide:

- Provide daylight and sufficient protection from the sun
- Keep rain and noise out when closed
- Let in enough fresh air for a comfortable temperature inside
- Be safe and easy to use
- Be easy to clean.

Camden asked residents what was important to them in the replacement windows. The technical report ordered the criteria based on what residents said were important to them, for example residents said letting in fresh air and ensuring a comfortable temperature was the most important criteria for them.

The risk assessment used a 5X5 matrix and considered the technical report to come to a weighted score. The scoring enabled Camden to give a risk outcome for each window design using categories with priority for delivery of actions as below:

**Risk = Severity x Likelihood.**

**High:** Risk being addressed is serious, action/control required urgently/immediately

**Medium:** Potentially serious, remedial action should be taken within agreed timetable

**Low:** Minor risk, monitor control measures and implement when resources allow

#### **17. Can the risk of items being thrown out of the windows be risk assessed?**

The behaviour of residents is not something that Camden can mitigate against, as we cannot control the actions of individuals. If the windows are used in the correct manner, then the risk level which has been assigned through the risk assessment will remain the same.

The risk assessment will inform the type of restrictor we put in place and the advice we give to residents about how the windows should be used.

Camden will also investigate all reports of antisocial and unsafe behaviour which we take very seriously.

### **18. Confirmation of Blashford window design and if it will be part fixed glass.**

Blashford has a different building structure to the other four blocks so there is an additional proposed change to the large rectangular windows in the corner of each flat.

We will be changing these windows because they don't meet enough of the criteria around ease of use, safety and maintenance. At present the large windows at Blashford are heavy which makes them difficult to use.

We don't propose changing the overall size of the window, but making the part of the window that can be opened smaller and easier to use. We propose to split the large pane in two so that half of it will open and half will be fixed closed. This will be changed at the same time as the other windows.

### **19. What is the window sill height? Will some windows need to be raised to comply with building regulations?**

Most of the sill heights in the Chalcots are already correct and are at least the minimum regulatory height of 80cm. Irregularities when the last works were carried out means that there are some flats where the windows will need to be moved up a few centimetres to meet safety requirements. Any issues with sill height will be corrected as works proceed, and all windows will meet the regulation sill height.

### **20. Will a trickle vent be part of the design?**

Yes, a trickle vent will be part of the scope for the design of the window unit. A trickle vent is a very small opening at the top of in a window to allow small amounts of air in. Trickle vents are used extensively in the UK and Europe and are built into window frames to provide minimum ventilation requirements.

### **21. What other window types do we have across our tower blocks in Camden?**

Many of our blocks above 10 storeys have windows that open outwards of various types (35 in total). We have seven blocks with the tilt and turn windows as set out earlier in this note. We also have one block with horizontal sliding sash and one with tilt inward only.

### **22. What were the response of the window pull test?**

Camden is installing metal cables as an additional safety mechanism on the original windows prior to the windows being replaced. We did two tests on the strength of the metal cables to ensure that they would prevent windows falling out in high winds.

One test was on the whole window and used drills to try to pull out the windows whilst the cables were installed, to test the cable strength to up to 4.5KN (over 450kg). This test was carried out twice and both times the metal cables passed.

In the second test the hinges on the window were removed to test whether the cables could hold the weight of the window and the cables passed this test too. Both tests exceeded safety expectations.

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