



Carried out at



**Cottrell Building  
Stirling University,  
Stirling.  
FK9 4LA.**

By



**Thermal Innovations Ltd**

8, Douglas Road, Leslie,  
Fife. KY6 3JZ.  
Tel/Fax: 01592 562415

Site Contact: David Jordan

Survey: STU001

Date: 17/02/08

Thermal Innovations Limited  
8 Douglas Road, Leslie, Fife, KY6 3JZ  
Tel: 01592 562415 - Fax: 01592 562415 - E-mail: [mclement@thermal-innovations.co.uk](mailto:mclement@thermal-innovations.co.uk)

REGISTERED OFFICE:

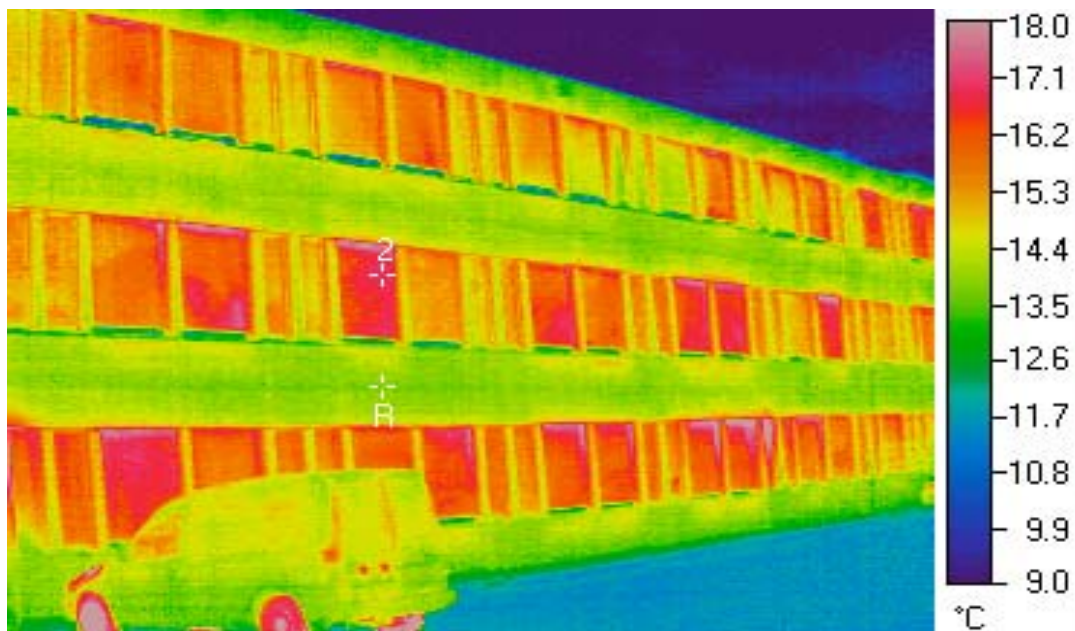


The Cottrell building as part of the Stirling University refurbishment program has had an external insulated cladding system installed. The existing single glazed windows have been replaced as part of this refurbishment with double glazed units. The main aim of this refurbishment besides the aesthetics was to improve the thermal efficiency of the buildings. The Facilities department of the University commissioned a Thermographic Survey to record any thermal performance improvement as the work progressed to completion.

The Survey was done on the one elevation of the Cottrell Building. When the initial survey was carried out there was one section that had the refurbishment work done. Subsequent surveys were carried out as the refurbishment moved along the elevation.

The following series of thermal images show the elevation in various states of refurbishment and also shows benefits of the refurbishment.

1. Elevation with no work done :- existing block and window temperatures are recorded. These show that the windows are ~3°C warmer than the stonework.

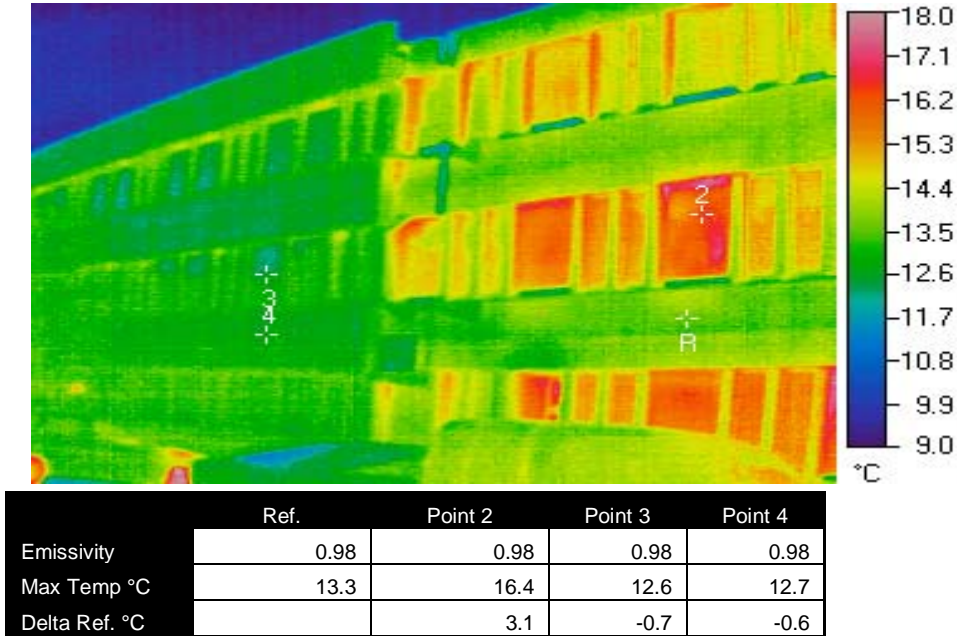


	Ref.	Point 2
Emissivity	0.98	0.98
Max Temp °C	13.7	17
Delta Ref. °C		3.3

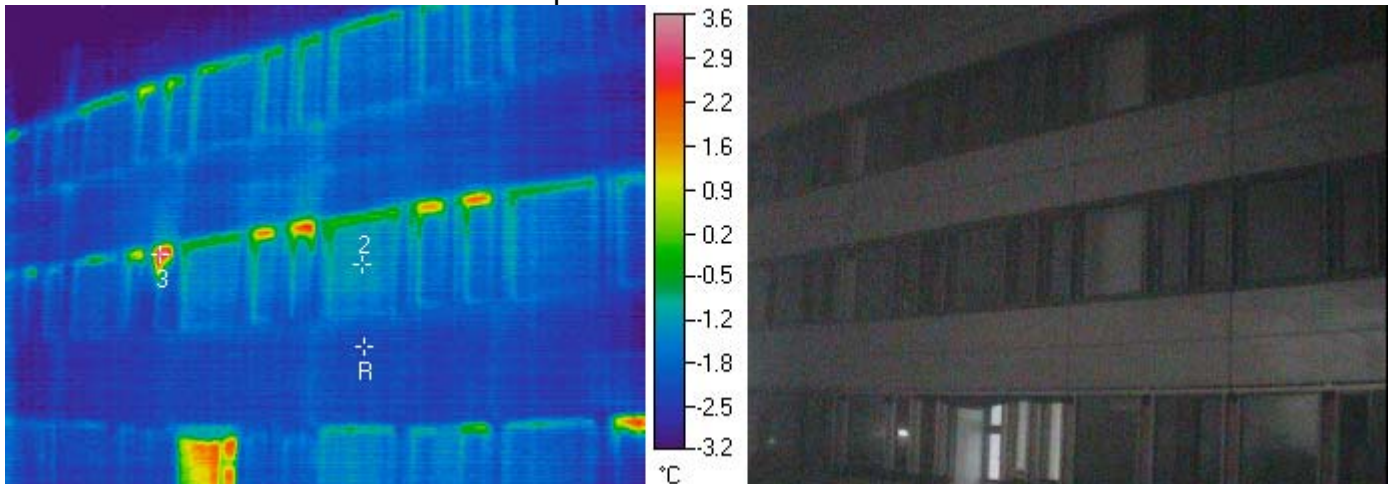


2. Elevation where one section has had refurbishment work carried out and the section next to it which is untouched. It can be seen that the window to cladding temp delta is  $\sim 0.1^{\circ}\text{C}$  on the refurbished section. On the untouched section the delta is  $\sim 3.0^{\circ}\text{C}$ . It can also be seen that the new insulated cladding is  $\sim 0.7^{\circ}\text{C}$  colder than the existing stonework .

These indicate that heat loss is reduced through the new cladding and new double glazing. The greatest savings on heat loss will be made through the windows as can be seen from the temp data.



3. This image is of the same area as image no.2 but after the next section was refurbished. It can be seen that the main entrance and the top of the windows in the new section show the most heat loss.



	Ref.	Point 2	Point 3
Emissivity	0.98	0.98	0.98
Avg Temp °C			
Min Temp °C			
Max Temp °C	-2.6	-1.1	3.9
Delta Ref. °C		1.5	6.5

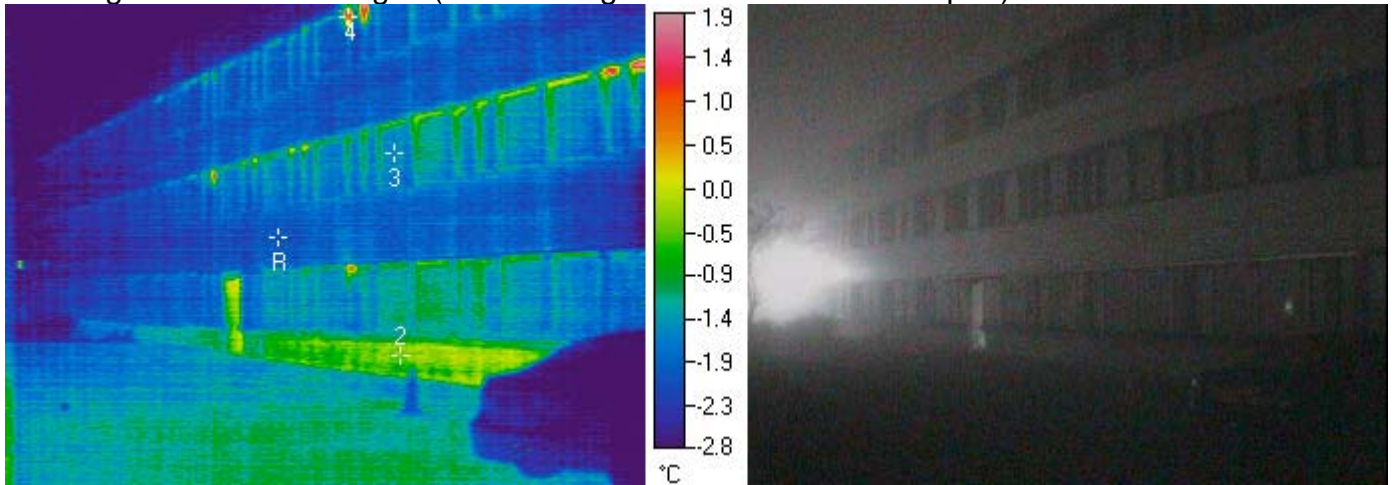
Thermal Innovations Limited  
 8 Douglas Road, Leslie, Fife, KY6 3JZ  
 Tel: 01592 562415 - Fax: 01592 562415 - E-mail: [mclement@thermal-innovations.co.uk](mailto:mclement@thermal-innovations.co.uk)

REGISTERED OFFICE:



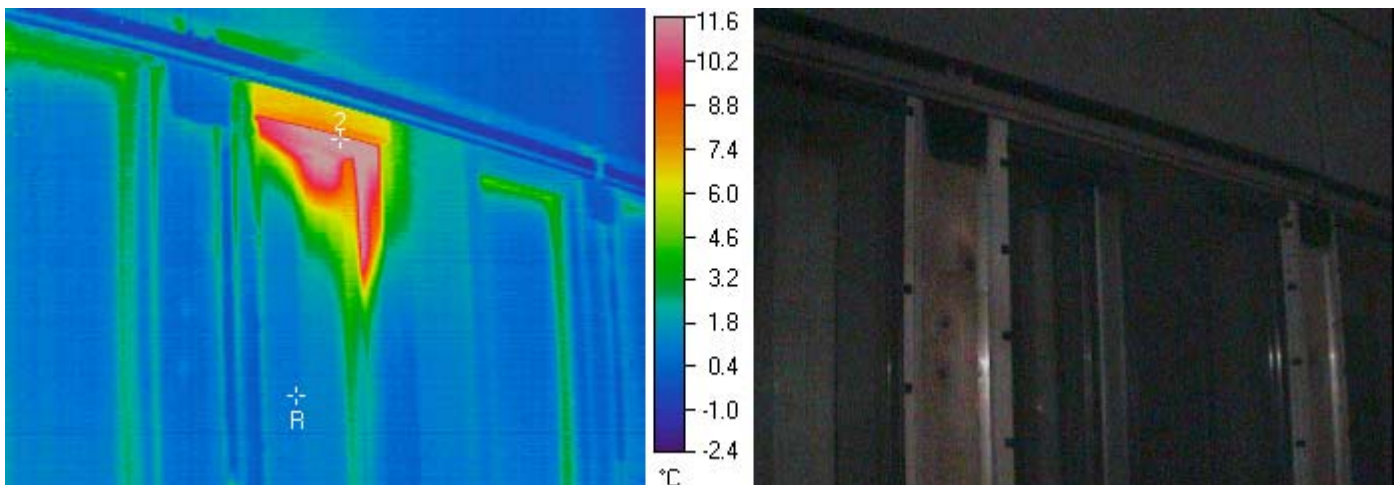


4. This image is of slightly a larger area that shows the same issues as image 3 but also shows that the area under the ground floor windows which have no work done to them in this project shows heat loss. There also appears to be a difference in the windows at the first done section as they are not showing the warmer to edges (not counting the windows that are open).



	Ref.	Point 2	Point 3	Point 4
Emissivity	0.98	0.98	0.98	0.98
Avg Temp °C				
Min Temp °C				
Max Temp °C	-2.2	-0.3	-1.4	1.3
Delta Ref. °C		1.9	0.8	3.5

5. This image is of an open window. The heat loss is evident and 34 open windows were counted along the whole elevation that was found to be open. The increased temps of the inner window surrounds indicate a potential thermal bridging issue.



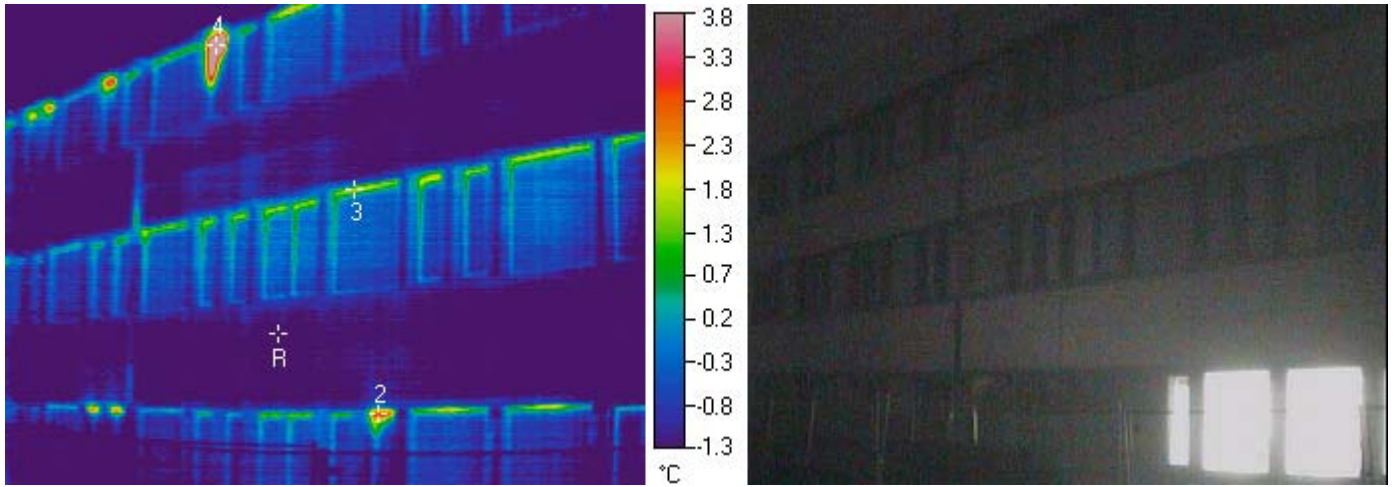
	Ref.	Point 2
Emissivity	0.98	0.98
Avg Temp °C		
Min Temp °C		
Max Temp °C	0.9	14
Delta Ref. °C		13.1

Thermal Innovations Limited  
 8 Douglas Road, Leslie, Fife, KY6 3JZ  
 Tel: 01592 562415 - Fax: 01592 562415 - E-mail: [mclement@thermal-innovations.co.uk](mailto:mclement@thermal-innovations.co.uk)

REGISTERED OFFICE:



6. This image is from further along the elevation and shows the same issues as images 4 and 5.



	Ref.	Point 2	Point 3	Point 4
Emissivity	0.98	0.98	0.98	0.98
Avg Temp °C				
Min Temp °C				
Max Temp °C	-1.4	2.7	1.6	7.7
Delta Ref. °C		4.1	3	9.1

### Observations:

The refurbishments do improve the thermal performance of the building. The biggest improvement in heat loss will be from the new windows (if they are kept closed). Any future projects should include the ground floor being cladded to maximize heat loss benefits.