

WINDOWS

The architect's intention for window usage is multifold. It is to provide a view outside and to allow natural light into the building. It may also provide a sense of place for activities and projects (e.g., plants).

What happened to the windows 'in use'? We noted in a previous report (Technical Factors) that certain schools had serious performance problems in lighting due to extensive window areas in and window placement in the classrooms. Do these findings affect use and performance? Measures were made of window shade manipulation to compare intended use with actual use and to analyze factors that reenforce or discourage the architect's intentions.

WINDOW USAGE

Performance required: The window should:

- Provide a view and a link with the outside
- Provide natural light
- Possibly provide a place for activities

Method: A window shade study, done on a sampled basis at different times of day and different types of weather. This study indicates whether the windows are actually used as intended or whether technical problems such as glare and contrast ratio interfere with such use. The characteristics of the different window (size, location, orientation) will provide information on which windows were most 'successful'. Openness of the windowshade is used as the measure of 'usefulness'.

Analysis: The windows, on the average, were 48% open. There is great variance between the performance of different windows - some types were 88% open. That is, the shades were virtually always open reinforcing intended usage. Other types of window had their windowshades almost always closed - they were only 10% open.

- Smaller window areas, such as those at the Richards School, are found to be much more open (unshaded) than those schools with extensive window areas. 75% of the window area at the Richards School was left unshaded, only 43% of the large windows, at Parkside and Smith Schools, were unshaded.
- Smaller window areas with north orientation are nearly always unshaded (88% open). These windows, at the Richards School, are most 'successful' in terms of fulfilling intended use.

- Skyglare is a real problem: The brightness (illuminance) of the sky is in the range of 1000-5000 footlamberts while the interior of the classroom may have large surfaces with 20 footlamberts. This causes problems in contrast ratio and discomfort/disability glare. In classrooms with extensive windows where the sky is visible, only 1% of all window area was fully unshaded. Shades were invariably drawn halfway down to eliminate this problem. At the Richards School smaller windows, (7'x12') for the most part located in the rear of the classroom, did not subject the users to sky glare. Fully 31% of the windows were fully open - the windowshades were unused.
- Clerestores: Almost all the clerestories at the Parkside School are completely shaded (only 14% of this type of window area is unshaded). Sky glare is one reason here as is the 'bother' of constantly opening and closing those 6 small shades, as well as 3 large window shades for darkening the room, etc. The teachers prefer, for both reasons, to leave the shades closed.

At the Richards School 3 large clerestories are oriented east - the users cannot see the sky. Here only these 3 shades plus a single windowshade must be manipulated for A.V. presentations. 75% of the area of the clerestory was unshaded.
- Orientation: This was less of a determinant than window space and location. North facing windows were only slightly more open (59%) than south facing ones (50%).

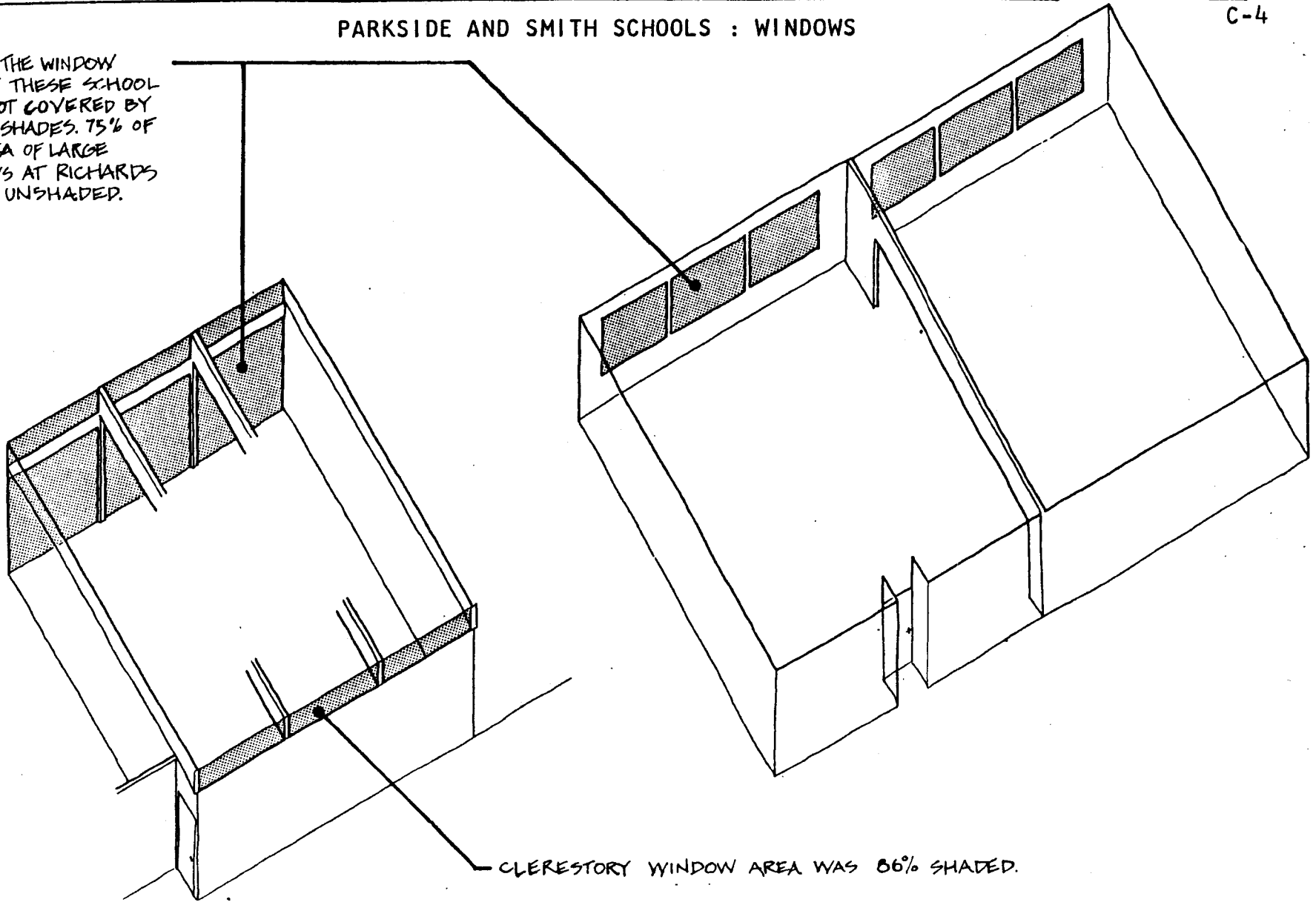
Findings: The actual usage of the windows is strongly determined by technical factors such as glare and room contrast ratios. Large glass areas with exposure of users to the sky glare should not be present (unless a low transmittance glass is used). Windows should be located in the 'rear' of the classrooms. The use of skylights and clerestories is a large expense and should be designed to minimize glare and for easy use.

'BUILDINGS IN USE' STUDY

PARKSIDE AND SMITH SCHOOLS : WINDOWS

C-4

43% OF THE WINDOW AREA AT THESE SCHOOL WERE NOT COVERED BY WINDOWSHADES. 75% OF THE AREA OF LARGE WINDOWS AT RICHARDS (C-4) IS UNSHADED.



CLERESTORY WINDOW AREA WAS 86% SHADED.

WINDOWS : RICHARDS SCHOOL

WINDOWS AT THE RICHARDS SCHOOL ARE USUALLY OPEN (UNSHADED). THE LARGE WINDOW IS IN THE REAR OF THE ROOM; THE SKYLIGHT CANNOT BE DIRECTLY SEEN BY SEATED CHILDREN. DIRECT GLARE & CONTRAST RATIOS ARE THUS MINIMIZED.

