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Consultants in solar studies, wind environments, wind-induced loads & vibrations

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Solar Reflectivity Studies

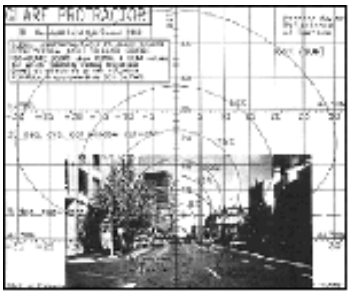
Solar glare from buildings is known to be a potential hazard to motorists. For this reason, councils now generally require a study of solar reflectivity from large building projects and recommendations for solving potential glare problems.

The method adopted by WINDTECH to examine solar reflectivity from buildings was developed by David N. H. Hassall. The Hassall technique is much simpler and more efficient than other methods such as those involving computer modelling and provides more information. The method is based on the use of a glare protractor and reflection protractor which determine the amount of glare to be expected from any building surface and the degree of annoyance.

The Hassall Technique

The advantages of using the Hassall technique include the following :

- Assesses potential reflections throughout the day (with different weighting between summer and winter solstices) in one simple diagram for each aspect of the building. This allows easy identification of the potentially affected zones.
- The precise effect of land topography, building alignments etc on the visibility of the building being studied is taken into account.
- The shielding effect of street objects such as trees, bill-boards can be readily and easily quantified.
- A direct comparison can be made with the standard comfort criterion of 500 candellas/m2, which has been adopted by a number of major local government bodies;
- The limiting reflectivity ratio of glazing which will ensure that the glare will comply with the comfort criterion can be easily determined from the glare protractor.
- For those cases in which the resulting glare exceeds the criterion, one may easily determine the approximate times and days in which the glare will exceed the comfort criterion.



The Hassall technique allows one to provide detailed information on the more critical aspects of the study. This in turn makes the study very efficient and also able to provide useful results with recommendations on types of cladding materials being used as well as the maximum allowable reflectivity ratio for the most critical areas.

An outline of the technique

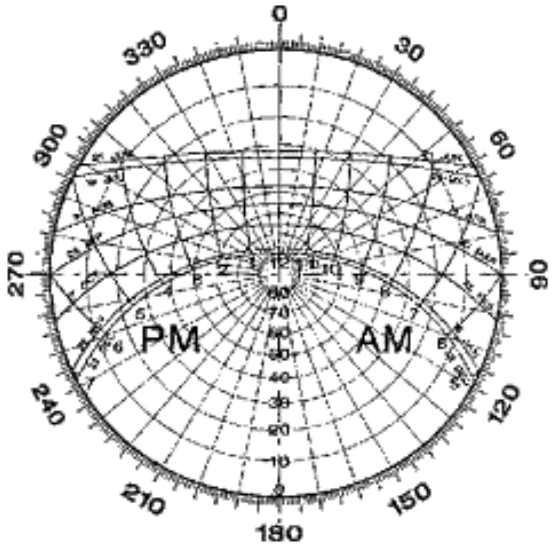
The solar reflectivity study involves the following steps :

1. Determine the precise orientation of the main aspects of the building. Produce a reflection protractor for each and determine from the reflection protractor the check zones (angular zones). The check zones represent the areas that are potentially affected by each of the aspects being studied.
2. Determine, from a site survey or otherwise, the most critical sight-lines in terms of their sensitivity to glare from the proposed development and the effect of the surrounding buildings in shielding the sun at the critical low altitudes.
3. Naturally, these sightlines are from study points located within the check zones determined from the

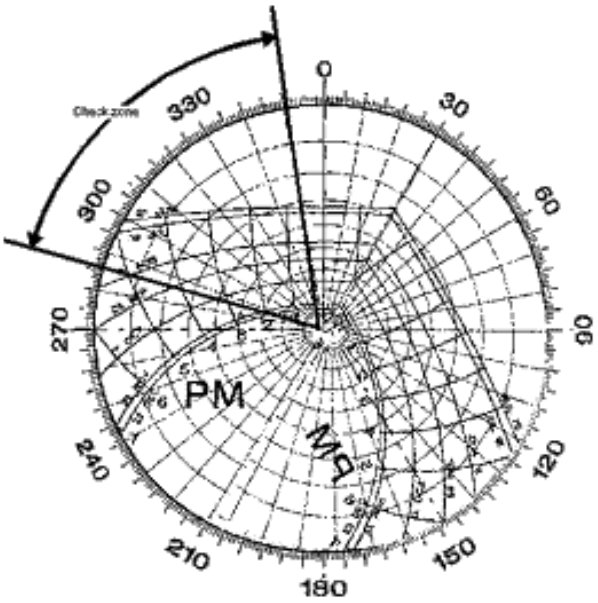
reflection protractors of the various critical aspects of the building.

4. Use a calibrated camera to photograph typical sight-lines by drivers/ pedestrians from the selected study points.
5. Overlay the photographs with the glare protractor to determine the extent of the glare produced by the building. Alternatively, the glare protractor can determine the limiting reflectivity ratio allowable on the critical areas of the building facade. The critical areas are determined from the zone of sensitive vision as indicated in the glare protractor.
6. If any areas are potentially critical, then prior to making any recommendations, examine the effect of overshadowing neighbouring buildings insheilding the sun at the critical low altitudes.
7. For the areas that are still likely to produce glare which exceeds the criterion, determine the times and days in which this is likely to occur by using the reflection protractor.
8. If the times are such that the glare is produced during times when drivers are subjected to stronger glare by means of direct solar glare or the glare occurs very early in the morning or for a very short time then the risk is minimal and no adjustment would be necessary.

Otherwise, determine from the glare protractor the maximum reflectivity ratio for the glazing in order to reduce glare to within the criterion of 500 candelas /m2.



Stereographic Sun Chart



Stereographic Sun Chart with diameter DD reflecting the reflecting facade with aspect 300 as if it were an infinite facade

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