

Safety Provision for PV Panel Access.

With the increasing number of Photovoltaic arrays (PV) being installed on buildings of all shapes, sizes and uses it is becoming increasingly obvious that in many cases there is little, or no concern given to the workers who are required to access the panels for maintenance purposes.

This can be down to a lack of knowledge on the part of the designer, but also, more worryingly, can be down to a trade off between output from the PV and the cost of the safety system to be installed.

Considerations for maintenance in design

One of the considerations made by the PV designer is the wattage of the PV to be installed. There is obviously a cost differential between higher and lower outputs per square metre, and therefore there is a tendency to choose a lower output and fill as much open space as possible with the panels.



Figure 1 Incorrect safety provision for maintenance workers is wide spread



Figure 2 Designed for maximum output means minimal access and safety

By opting for this approach there is little or no space left for the installation of safe systems of work using passive or active fall protection.

This is in direct contravention of not only the Working at Height Regulations but also the Construction (Design and Management) Regulations (CDM Regs) 2015.

Under both of these regulations it is the responsibility of the Duty Holder or Designer to ensure that safety can be provided for the worker who is to perform maintenance tasks on a regular basis. The failure to provide these safe systems of work means that when maintenance is required additional access means are employed.

These range from scaffold erection to mobile platforms (MEWPs). The use of scaffold is a suitable way of providing temporary access and edge protection, but this becomes very costly over the life of the PV, outweighing the savings made on the initial design.

Using a MEWP for access is OK for visual inspections and cleaning, providing the worker does not have to lean through the cage of the MEWP basket, but if any repairs are needed then this is absolutely not the correct method of access, again meaning the use of scaffold becomes required.



Figure 3 Scaffold provides safe access in some areas, but is costly

Fall Protection Systems and Suitability

When a fall protection anchorage is designed and installed there is required to be the same level of protection afforded as in any other work at height scenario. The maintenance worker will need access to every panel and will be required to be attached at all times.



Figure 4 Incorrect use of rope systems can lead to massively increased risks

The use of the correct PPE in order to keep the complexity of use to a minimum is critical here. The use of ropes and grabs is high risk as they can lead to misuse, pendulum swings and therefore increased fall distances.

As in all working at height anchorage design the system should be initially designed to be a fall restraint system, with a fixed length lanyard requiring no direct input from the user. The maintenance worker should be able to give their full attention to their dedicated task, without complex actions required to adjust lengths of ropes, use anti-pendulum posts etc.

Also, the worker needs to be considered in the design of the anchorage layout. Remember that the worker will more than likely be a specialist PV technician, and therefore will work on many buildings, so the specifics for the layout and PPE use for a particular building will require them to undergo training for each and every building they access, increasing time and costs for every job.

Also to be taken into account is should a system be required to be a fall arrest system through poor PV layout design then the worker will be required to be supplied with a rescue plan, rescue equipment, rescue training and therefore an equally trained and equipped co-worker. This again increases the costs.



Figure 5 Use of fixed length lanyards reduces risk

Summary

So, in conclusion, the design of PV arrays to be the highest yield for the lowest cost is, in many cases false economy, and does not provide the safety required under regulations for design, or for working at height for maintenance.



Figure 6 Panels and Lifelines positioned for ease of access

Safe design for maintenance should reduce the life cost of the PV array. Consideration should include:

- The use of higher wattage output per square metre,
- Inclusion of fall restraint anchorages or passive safety solutions at initial design and installation;
- Regular working at height assessments
- Work at height training

By properly assessing the risks and costs over the life of the PV, and potentially increasing the cost for the initial PV installation then we can potentially keep the costs of the maintenance to a minimum though its life.

It is the life cost that should be considered in the design initially, and by life cost we do not just mean the life of the PV array, we also mean the life of the maintenance technician.