CERC CONFERENCE 2017 - NEW FRONTIERS IN CONSTRUCTION

RESEARCH PROJECT

Application of Prevention through Design to Improve Safety in Solar Installations for Small Buildings

Mar 16, 2017

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Annual U.S. Solar Energy Production

(Source: GTM/SEIA, 2016)

Reference:

- GTM/SEIA (2016). "U.S. Solar Market Insight. Executive Summary. 2015 Year in Review". GTM Research and Solar Energy Industries Association.

Safety in Solar Energy Installation

- **Solar Energy Installation**
  - On rooftops
  - At outside conditions

SAFETY FACTS

- Falls account for 35% of fatalities in construction (CPWR 2015)
- Almost 50% of construction fatalities and accidents are linked to design decisions (Behn 2005)

Reference:

- Behm, M. (2005). "Linking construction fatalities to the design for construction safety concept". Safety Science 43, 589-611.
- CPWR. (2015). "Quarterly Data Report: Third quarter 2015". CPWR – The Center for Construction Research and Training.

PtD for Solar Safety

Address Safety Issues from the Design Process

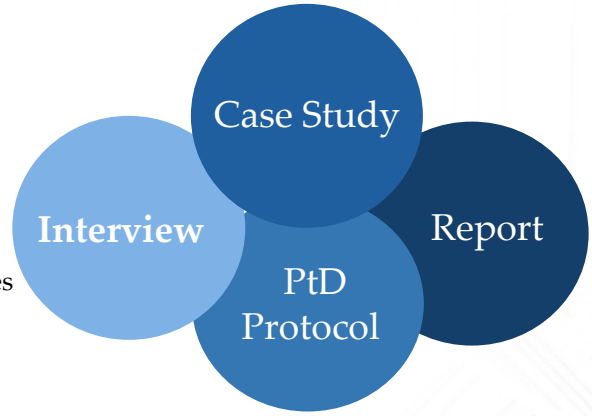
Site Assessment → **Design a Solar Energy System** → **Installation** → **Operation**

Basic Steps to Obtain a Solar Energy System

Research Method

Analyze PtD attributes through case study projects

Investigate safety practices and identify PtD attributes



Develop the final report and publish the paper

Develop a PtD guidance and obtain industry feedbacks

Review codes, regulations

Interview Industry Experts

Observe Site Installations

Conduct a Seminar

Research Activities

Participate Solar Workshops Conferences

PtD Attributes in Solar Safety

• Roof Material	Influence of roof materials on the location of safety anchors, and the safety operation at unfavorable weather conditions
• Roof Slope	Influence of roof slopes on working platforms and working methods
• Roof Accessory	Different safety impacts caused by roof vents, chimneys, skylights
• Panel Layout	Influence of clear access pathways and the clearance between panel edge and roof ridge on the safety in solar installation
• Fall protection system	Influence of roof conditions on the design of fall protection systems
• Lifting Method	Influence of panel size, panel weight and wind condition on lifting methods
• Electrical System	Shocking hazards caused by the solar power; Tripping hazards by the wires, conduits.

PtD Attributes in Solar Safety *(cont.)*

- Roof Material
- Roof Slope
- Roof Accessory
- Panel Layout
- Fall protection system
- Lifting Method
- Electrical System

Conclusion

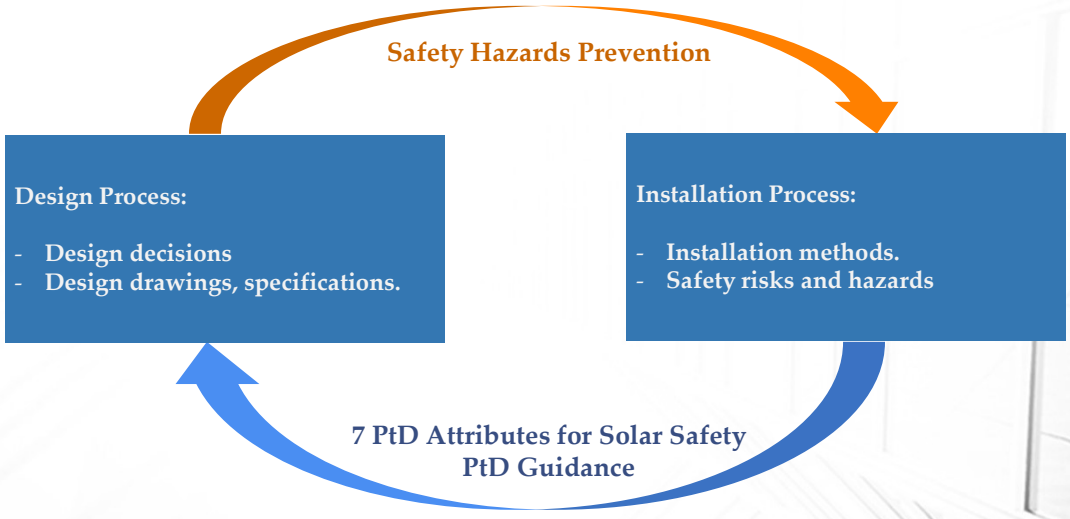


Diagram for the Implementation of PtD to Improve the Safety in Solar Installations

THANK YOU !

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