Air Barriers

US Army Corps of Engineers®

- Deep Energy Retrofit of Buildings
- Nick Alexander
- 16:20-16:40
- Thursday, September 15

USACE and Army Success with Air Barriers

- ERDC/CREL Whitepaper from an industry partner revealed that .25CFM/SQFT at 75PA is attainable across all building types and facilities in new construction
- Personal experience with 81 buildings to date on Ft. Carson of all wall types and facilities types had only 3 total failures to meet the requirement in new construction.
- 4th ID CAB HQ building on Ft Carson currently is the lowest known leakage rate building in the Army new construction inventory at .03 CFM/SQFT @ 75 PA.
- Typical tested passing range of new construction buildings is from .10-.15 CFM/SQFT @ 75 PA.

USACE and Army Air Barrier Success

Combat Aviation Brigade HQ

•Insulated Concrete Form wall type.

•Air Barrier test result was a .03 CFM/SQFT at 75 PA. Lowest in the Army inventory and historically for this type of building.

•Only detectable source of leakage was around doors an windows and one mechanical louver!

•Clear wall had no leakage and the thermal envelope of the ICF was uniform around the entire building.

•QA and QC effort was critical in attaining this low leakage rate.

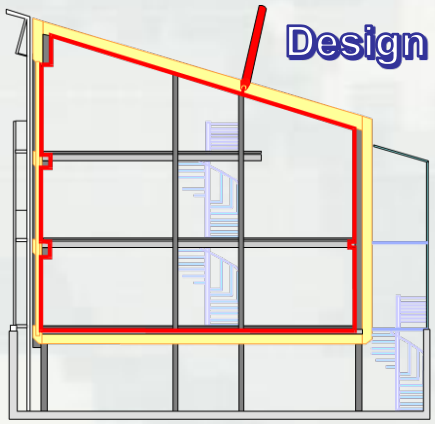
The Next Step: DER and Minor and Major Renovations

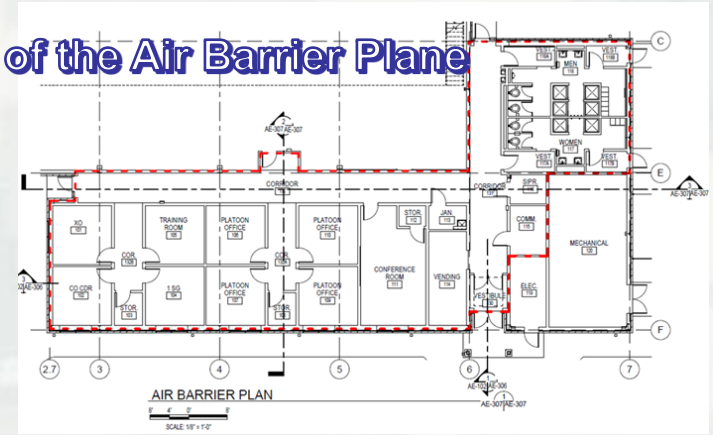
- Air barriers are a critical aspect of a building for energy conservation and efficiency.
- DER (air barrier required) as well as minor and major renovations can incorporate air infiltration and exfiltration mitigation measures to improve envelope performance as an energy conservation measure.
- Minor and major renovations may have more targeted measures employed with air barrier applications to meet project goals.

The Next Step: DER and Minor and Major Renovations

- Chapter 10: Improved Air Tightness
  - What is an Air barrier?
  - Selecting and knowing the performance standards Table 10-1 (US and European)
    - Proposed .15 CFM/SQFT @ 75 PA for USACE HP Buildings and Deep Energy Retrofit
  - Design
    - DER projects will design an air barrier into the project to meet the above proposed standard country specific standard.
    - Minor and major renovations may have a building envelope assessment performed to determine the leakage of the existing envelope to develop the scope of the improvements as feasible.
    - Materials are selected for incorporation into the project.
  - Construction quality is CRITICAL to meet design energy targets and basic aspects of this are included in this chapter.
  - Testing to validate performance requirements is the last critical step in validating both the design and construction of the air barrier system.

Design of the Air Barrier Plane

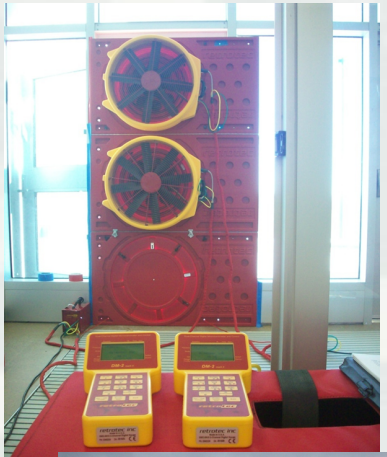




Construction QA and QC

Materials Selection

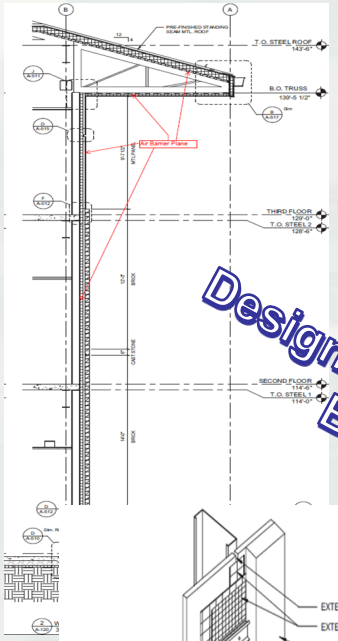
Pre and/or Post Testing

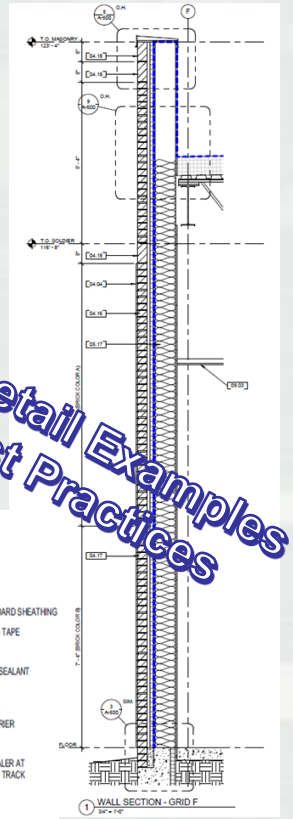


The Next Step: DER and Minor and Major Renovations

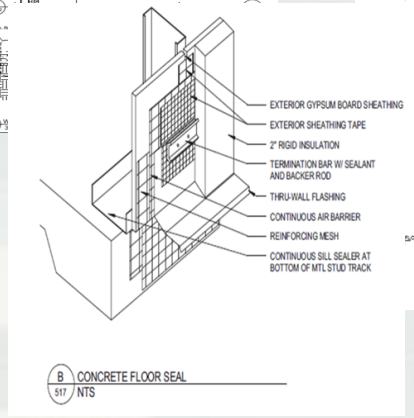
- Appendix F: Best Practices
  - Design/Drawing Detailing is critical for proper construction to achieve project goals.
  - Appendix F provides examples of details that are typical for air barrier systems for DER, minor and major renovations of various wall types.
  - Appendix F provides some examples of means and methods for finding and addressing air infiltration and exfiltration points in building envelopes.
  - Shows typical but not every potential area of concern for air barrier systems.
  - Quality Assurance Guide for proper inspection and critical points for quality construction and application of materials in the field.
  - USACE testing procedures for testing weather pre or post testing the assemblies of the building envelope.

Mock-up Review





Design Detail Examples and Best Practices



QA and QC Inspection Points and Guidance

Testing and Diagnostic Guidance and Examples

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