

Excavationless Exterior Foundation Insulation Field Study

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Industry Partners:

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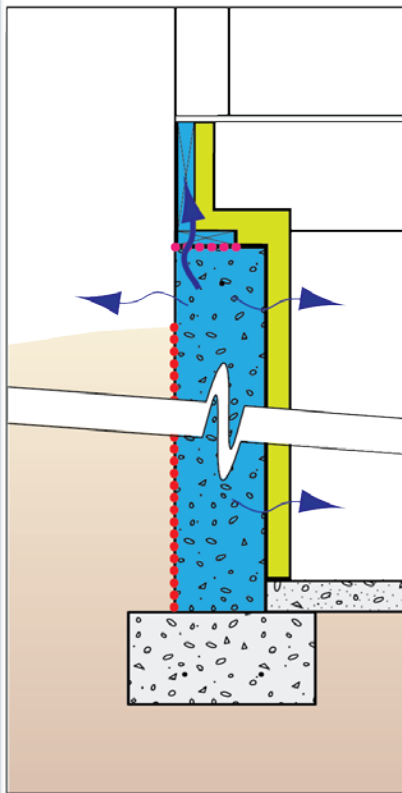
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Context

Much of household space conditioning energy use, particularly in heating climates, can be attributed to lack of insulation on the basement wall and rim joist. Most existing houses have uninsulated foundations.

There are two potential locations for basement/rim insulation upgrades:

Interior insulation upgrade



Existing foundations lack moisture control at the foundation face, and lack a capillary break at the sill.

Interior insulation makes the wall colder, thus weaker. Interior insulation materials have low permeability, so walls stay wet.

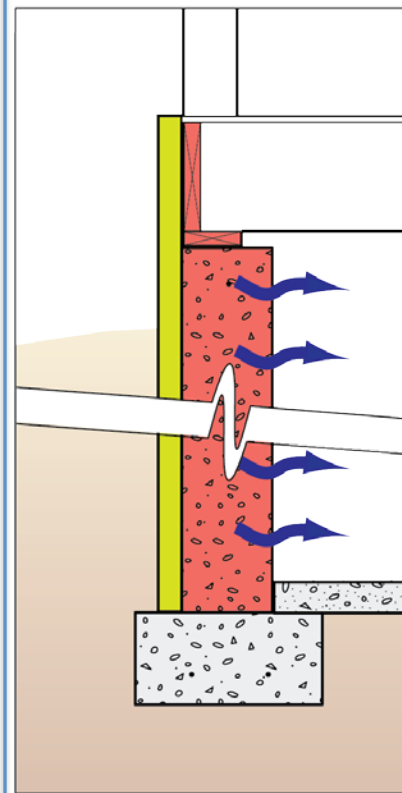
Rim and sill are particularly vulnerable to moisture accumulation and decay.

Most insulation materials require an ignition barrier, adding to costs.

Interior approaches that solve the hygrothermal issues are likely expensive.

Conventional methods can lead to mold and health issues.

Exterior insulation upgrade



Exterior foundation insulation confers multiple hygrothermal benefits, and missing moisture control materials can be added, or their importance to the hygrothermal regime diminished because the wall is warm, and can dry readily to the interior.

Typical exterior approaches are costly, destructive to the landscape, and disruptive to homeowners.

Capillary action can be an issue for both methods.



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is specified in the appropriate building code. For additional information, consult MSDS or
Contact Omega Curing World Headquarters at 1-800-...
... when the greater the insulation power. This insulation must be installed properly
... the marked brand. Follow the manufacturer's instructions carefully. If
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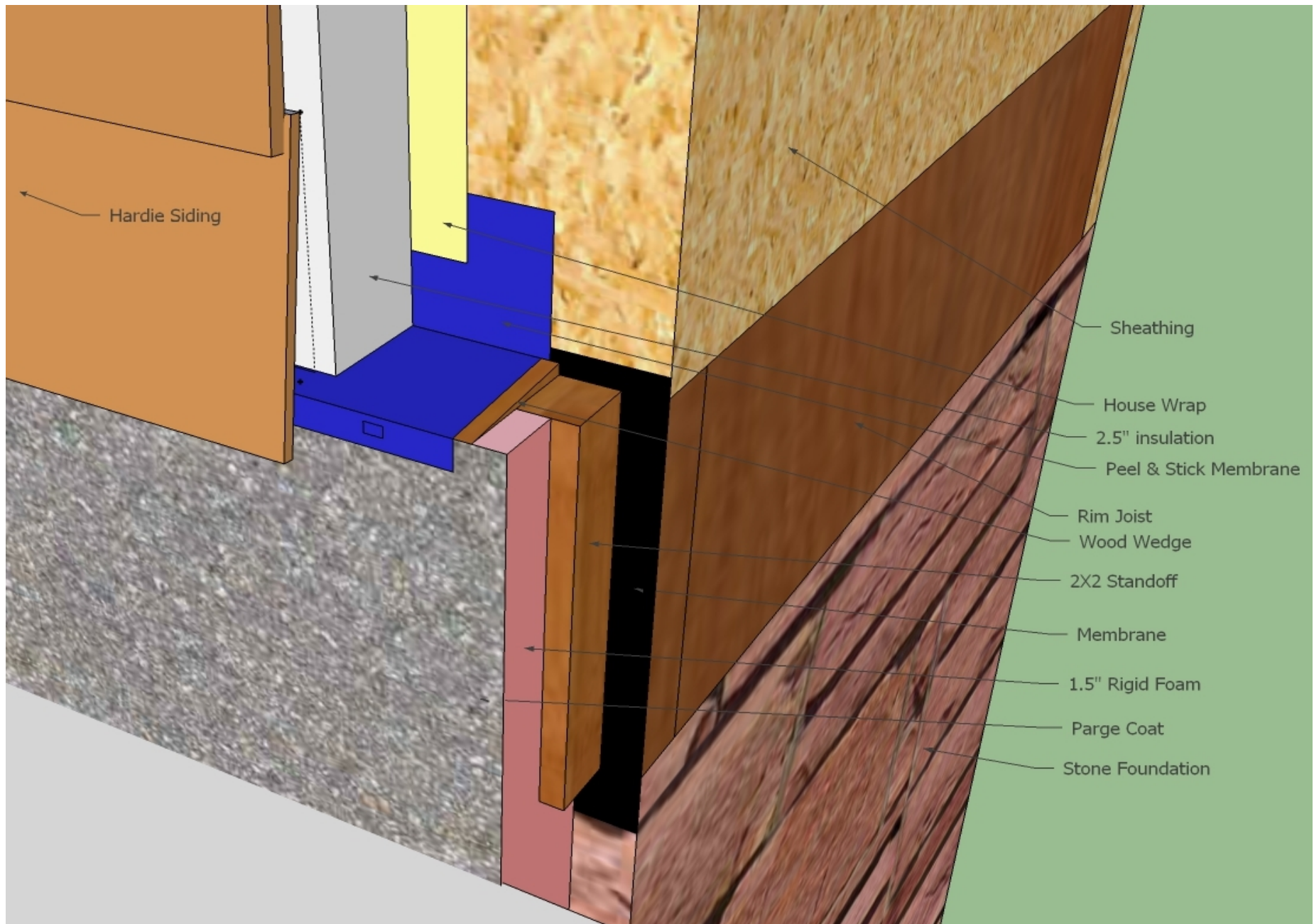
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EXCAVATIONLESS

In order to achieve energy reduction goals, it will require some savings from foundations as well.

Could be applied to millions of homes that have up to now been considered problematic.

- Homes with finished basements
- Homes with inaccessible basement walls
- Homes with expensive landscaping
- Homes with crawl spaces
- Homes, townhomes, and apartment buildings with slab foundations
- Homes and buildings needing water proofing and drain tile
- Buildings that need foundation repair
- Insulation under porches and sidewalks

2010 Census

Single unit buildings in U.S.	87,966
With basement under all of building	28,274
With basement under part of building	9,104
With crawl space	19,650
On concrete slab	29,451

Value

Cost comparison table

(model is 36' X 28' foundation, 2' exposed above grade, plus rim.)

Retrofit Approach	Insulation Type	Nominal Wall R Value	Material Cost	Labor cost	Excavation cost	Total * cost
1) Full depth exterior rigid foam. From top of rim to bottom of trench.	3" XPS @ \$1.25 per sq	R-15	\$960 (plus \$833 for water barrier)	\$2,880	\$2,920 (traditional power shovel)	\$7,593
2) "Excavationless" exterior foam (4.5' BG to grade) Plus 1.5' AG.	Cast-in-place polyurethane foam (4") Plus rigid to top of rim	R-20 (ave)	\$4,224 B.G. (1.50/brd ft.) \$698 for rigid and foam above grade.	included	\$1,650 (Hydro-vac)	\$6,572
3) "Excavationless" exterior foam (6" bottom of trench to top of rim)	6' - footing to rim top. 1.5" rigid plus 1.5" cast-in-place foam	R-15	\$2,142 Foam \$1,152 Rigid XPS \$990 (labor included)	included	\$1,650 (Hydro-vac)	\$3,792

* Cost does not include landscaping remediation, which will likely be higher for "traditional" methods

Next house for Excavationless. TO5 “Best of NSTAR”. We will apply three or our tested measures: Excavationless, Overcoat for roof and wall, and Combi. This will be for affordable housing in North Minneapolis.





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