RADIATION RESEARCH OVERVIEW

VERSION
as of 30-9-98
by Tim RENOUF

PROBLEM: DEFICIENCIES IN THERMAL TESTING

Current method for testing thermal performance of bulk insulation materials is by CONDUCTION via "Guarded Hot Plate" (35°/hot, 15°/cold)
There have been no tests done for RADIANT heat

OBJECTIVES OF AFIA

1. Perform RADIANT heat tests for all insulations
2. Reveal the performance differences between foil and bulk insulations under summer/hot conditions
3. Reduce summer electricity consumption for cooling.
4. Improve energy efficient Building design
5. Contribute to a lowering in national Greenhouse gas emissions.

AFIA
Aluminium Foil Insulation Assoc. Inc.
(Secretary: Tim Renouf)

create a publication

•NON-TECHNICAL
FOR USE BY PUBLIC

CSIRO – DBCE Melbourne (AUTHOR)

"DESIGN GUIDE FOR ENERGY EFFICIENT HOUSING IN TROPICAL & MIXED CLIMATES"

(a) PRINCIPLES: Building design, Condensation, Ventilation, Heat Bridging, Solar Gain, NatHERS

(b) DESIGN EXAMPLES WITH ENERGY RATINGS:
12 housing studies revealing annual MJ/m² (KWh/m²) per annum & STARS***
Develope a Building Comfort Model – "Open versus Closed building evelopes"

(c) THERMAL PERFORMANCE OF MATERIALS & SYSTEMS
Precision measurement of individual insulation products – sample testing.

entailing

RESEARCH PROJECT

"EFFECTS OF RADIATION ON THERMAL INSULATION MATERIALS"

•Primary Coordinators
#Secretary

PARTICIPANTS:

1. CSIRO-DBCE (Thermal Technologies) Highett, Melbourne — • Angelo Del Sante, Robin Clarke
2. Aust. Institute of Tropical Architecture (AITA) James Cook Univ., Townsville. — • Prof. Richard Aynsley
3. Qld Dept. Public Works & Housing (QDPWH) Built Environment, Brisbane — Dale Gilbert
4. Faculty of Built Environment, UNSW Sydney. — Prof. John Ballinger
5. Aluminium Foil Insulation Assoc. Inc. (AFIA) Melbourne — #Tim Renouf, James Fricker

PROJECT OBJECTIVES

1. Measure the thermal resistance of bulk and foil insulations against summer radiation (i.e heat flow-in)
2. Determine which insulation systems achieve and maintain the lowest temperature of internal ceiling and wall linings.
3. Incorporate findings into NatHERS and develope a comfort-based version of NatHERS for "Open Envelope" buildings.
4. Report findings to Standards Aust. BD/52/1 and AIRAH

PROJECT DIVISIONS

1. TEST RIG (CSIRO-DBCE) → Modified Guarded Hot Plate Method for product samples to be tested
2. THE DEVELOPMENT OF A NEW VERSION OF NatHERS (Open Envelope) →
3. FIELD TESTS (A.I.T.A.) → Framed houses (min. 3) available through QDPWH and others
4. VALIDATION OF NEW VERSION OF NatHERS through field measurements in the real world →

PROJECT COSTINGS

1. $14,500 Initial set & first sample
   $1,600 thereafter per sample.
   estimated total = $25–$30,000
2. $30,000
3. $7,000 per test
   3 houses
   3 insulations per house
   3×3=9 × $7,000 = $56,000
4. $12,000

\+ 5. CSIRO "DESIGN GUIDE" Preparation and publication costs $12,000 — PUBLIC USE DOCUMENT

TOTAL $140,000

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2. AAC – Australian Aluminium Council	John Coutts
3. KAAL – formerly Comalco Ltd.	Bob Iddles
4. Queensland Govt. (through Dept Public Works & Housing – QDPWH)	Dale Gilbert
5. Northern Territory Govt. (Dept. of Transport & Works – NTDTW)	Jo Kieboom
6. SEDA – Sustainable Energy Development Authority	Nicolette Boele
7. ABEC – Australian Building Energy Council	John Ballinger (UNSW)
8. EEV – Energy Efficiency Victoria + other state equivalents	Tony Isaacs, Kyle Garland