

A Low-Cost Ceiling System for Low Cost Housing

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Overview of presentation

- Background and motivation
- Ceiling Insulation
- Ceiling Concept
- Installation and Cost
- Results
- Conclusion



Background and Motivation

Background

- 20 years = over 2.8 million new houses
- Many housing units are energy inefficient
- Lack of ceilings contributes to energy inefficiency



Motivation

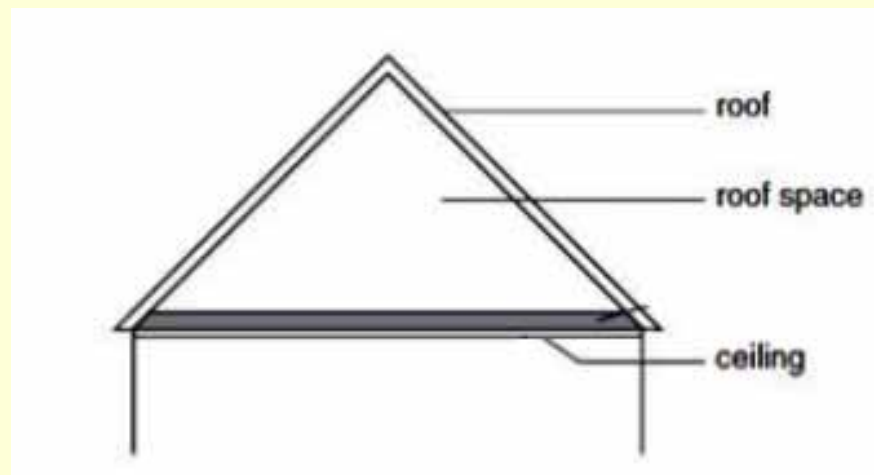
- Past simulations show winter heating reduced by 74% with ceiling
- Large energy savings are available merely with ceiling installations



Ceilings

Ceilings

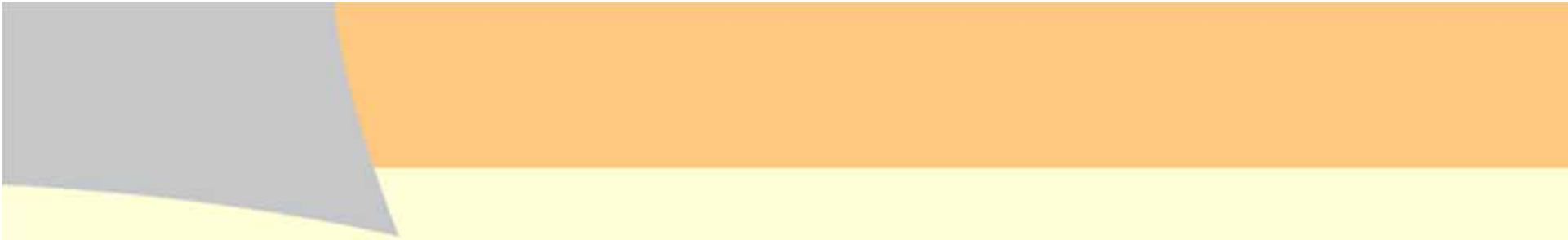
- Proper ceilings:
 - Provide insulating effect
 - Reduce infiltration of air in/out of room
 - Reduce effect of stratification
 - Reduce effect of radiative losses via roof



Ceilings

- Study in 2006 quantified electrical energy reduction in houses with ceilings versus without

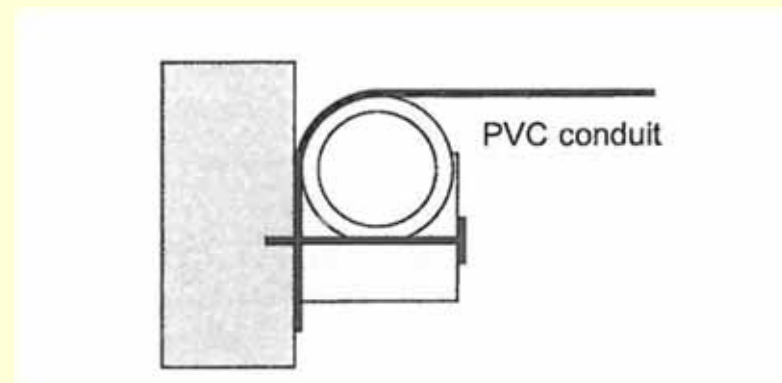
Location	Reduction (%)
Bloemfontein	48
Cape Town	72
Durban	82
East London	95
George	80
Johannesburg	60
Kimberley	59
Phalaborwa	83
Port Elizabeth	92
Pretoria	75
Upington	62



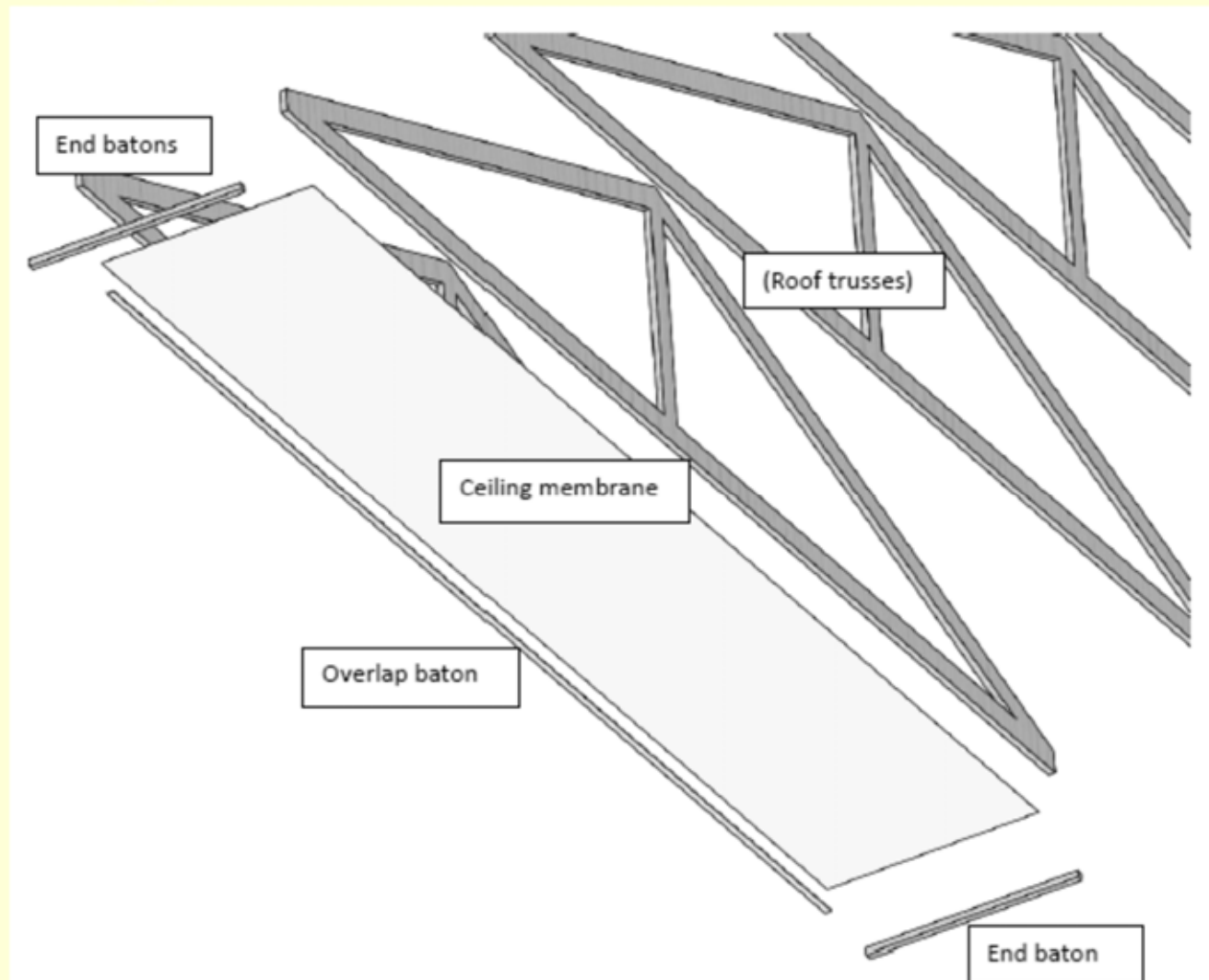
Ceiling Concept

Ceiling Concept

- Commercial ceilings available but not often installed
 - Expensive (R130 - R145/m²)
- Previous low cost concepts
 - Ceiling fastened to wall
 - Suffered from sagging



Ceiling Concept





Installation and Cost

Installation and Cost

- Small installation teams
- Low skill level
- Materials in installation packages
- Materials commercially available (any membrane)

Installation and Cost

- Easy to transport
- No painting requirements
- Final cost = R27/m² (Ideal membrane)





Results and Conclusion

Results

- Ceiling concept achieved similar savings as a conventional ceiling
- 250 – 400 MW savings nationwide
- Between R100 and R350 per year homeowners savings during winter
- Payback period = 3 - 10 years

Other Benefits

- Temperatures reduced by up to 4°C during summer
- Lower dust accumulation in living space
- Aesthetically pleasing

Conclusion

- Ceilings have a large impact on energy savings
- Large amount of low-cost housing is without ceilings
- Presents opportunities for large energy savings

Conclusion

- Low-cost ceiling system a viable option
- 3 - 10 year payback period = outside financing required



Questions?