

Stove Safety Testing

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Motivation

- ❑ Stove hazards include cuts, burns, scalds and loss of property
- ❑ People with little technical experience in safety are designing and implementing stoves
- ❑ Need exists for a standardized set of safety guidelines and metrics
- ❑ Conventional methods require expensive equipment and technical experience

Injuries



Third-degree burn from skirt fire.



Scald from overturned pot.

Background Investigation

- Must factor in local needs and abilities
 - Cooking conditions and family culture
 - Cooking needs
 - Technology and technical expertise

- Data set included over 40 types of stoves
 - Solid biomass (most common)
 - Liquid/gas
 - Solar (box and focal)



Hazard Identification

- ❑ Hot surfaces and open flames
- ❑ Cookstove construction and center of gravity
- ❑ Sharp edges and points
- ❑ Cookstove integrity and uncontrolled fire
- ❑ Fuel concerns

Equipment and Rating

- Safety rating system (Best-4, Good-3, Fair-2, Poor-1)
– established on risk of injury

- Use of simple equipment

Cookstove

Cookpot of size most often used

Fuel

Tape measure or ruler

Cloth / rag

Calculator*

Thermometer*

Infra-red thermocouple*

Safety Guidelines

Guideline 1: Exterior surfaces should be smooth and not cut flesh.

Purpose:

- a) Reduce risk of cuts that can become infected.
- b) Lessen occurrence of skirts and clothes that catch stove and result in tipping.

Guideline 2: Cookstove should not be easily overturned.

Purpose:

- a) Reduce risk of scalds from overturned pots.
- b) Prevent burning fuel from spilling from stove.

Safety Guidelines

Guideline 3: Burning fuel should not be exposed.

Purpose:

- a) If stove happens to tip over, fuel will not be spilled.
- b) Crackling wood cannot be expelled from stove.
- c) Children unable to touch burning fuel.

Guideline 4: Area surrounding the cooking surface should be flat.

Purpose:

- a) Reduce risk of scalds from overturned pots.

Safety Guidelines

Guideline 5: Surfaces should not burn when touched.

Purpose:

- a) Reduce 1st and 2nd degree burns for adults.
- b) Reduce 1st and 2nd degree burns for children.

Guideline 6: Heat transfer to surroundings should not start fires.

Purpose:

- a) Eliminate risk of house fires from stoves put close to the walls or near combustibles.

Safety Guidelines

Guideline 7: Construction touched during cooking should not burn.

Purpose:

- a) Eliminate 1st and 2nd degree burns from handles or doors.
- b) Allow proper use of handles or doors.

Guideline 8: Chimney should be shielded from touch if burns possible.

Purpose:

- a) Greatly decrease risk of 1st and 2nd degree burns from touching hot chimneys.

Safety Guidelines

Guideline 9: Flames touching cookpot should be concealed.

Purpose:

- a) Eliminate 1st, 2nd degree burns from contact with flames.
- b) Eliminate risk of 3rd degree burns from skirt fires.

Guideline 10: No flames should exit the fuel loading area, storage container, or transfer mechanism.

Purpose:

- a) Eliminate risk of 3rd degree burns from skirt fires.
- b) Stop fuel leaks.

Implementation

- Experimentation
 - Stoves Analysis Lab – ISU
 - Aprovecho Research Center – Oregon
 - Honduran Association for Development – TWP, AHDESA
- Summarized procedures and safety evaluations conducted for over 40 stoves.

Awareness and Development

- ❑ Academic influence – conference proceedings, journal articles (2), experiences in classroom and study abroad courses
- ❑ Peer review – masters thesis, stoves groups (heat-sensitive paint)
- ❑ With help of people like you 😊

Questions?

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