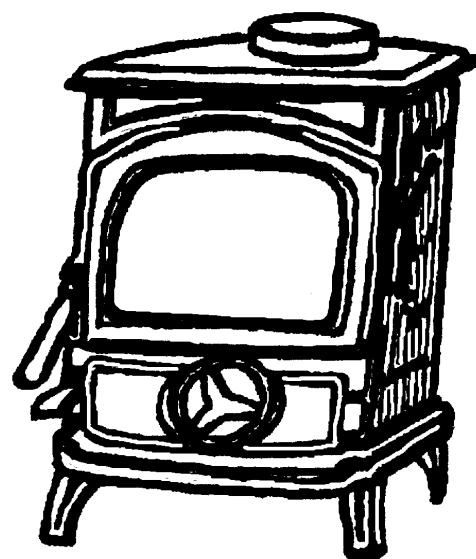


## Solid Fuel (mineral and wood combustion) Stoves



A review of their manufacture, supply, installation and use in UK inland waterway boats

**Executive summary of findings - 2003**

## **Introduction**

This report was commissioned by the Boat Safety Scheme (BSS) following a number of incidents, involving solid fuel stoves of fire and of carbon monoxide poisoning, including a double fatality in January 2003. Its purpose was to identify the knowledge about and the practices of, the manufacture, supply, installation and use of solid fuel stoves on private boats in the UK. The researcher was also asked to identify hazards associated with their use. The author is David Fuller BSc, I.Eng MIMarEST. He is a marine surveyor and lead quality control assessor for the BSS.

## **Methodology**

The project has predominantly been an information collection exercise, with over 250 companies, groups and individuals being independently contacted. These consultees included those with a specific interest in the inland waterways and the marine industry,

- BSS Technical and Advisory Committees members
- Canal Boatbuilders Association (CBA) members
- marine insurance companies
- European and American marine trade associations and regulatory bodies

It also included consultees from the general heating industry and government, including

- stove manufacturing companies
- trade associations
- Trading Standards
- Office of the Deputy Prime Minister (ODPM)
- Department of Trade and Industry (Dti)
- Department of Health (DoH)

## **Population of stoves on UK inland waters**

The research suggests that the annual inland waterway market for solid fuel stoves is in the region of 1000 units, with very approximately one quarter to one third of these being sold to private boat owners for DIY installation. The remainder are fitted by boatyards and other professionals.

Responses from contributors indicates that 75 to 80 per cent of existing steel narrowboats are fitted with solid fuel stoves. It is estimated that there are around 14,000 ( $\pm 1,000$ )<sup>1</sup> narrowboats on UK inland waters

## **Reported fire and other incidents caused by solid fuel stove installations**

Anything more substantial than a minor onboard incident will probably provoke an insurance claim. Therefore information provided by the marine insurance related sector probably represents an important account of the nature and extent of solid fuel stove fire incidents.

Using that sector's figures, together with general advice received from other contributors, it is estimated that there may be an average of 10-15 significant fire incidents per year, and between 0-2 incidents of significant CO poisoning per year, caused by solid fuel stove installations. These figures exceed the number of incidents recorded by the BSS Office for this type of appliance.

## **Canal Boatbuilders' Association members' views**

Sixty-three of ninety-five companies completed a questionnaire. The main questions and responses are produced below

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<sup>1</sup> Extrapolated from British Waterways survey figures for steel-hulled boats.

### **How many stoves do CBA members install per annum?**

Together, CBA members install approximately 300 new stoves each year.

- 195 (65%) stoves installed in new boats,
- 74 (25%) are replacements for an existing stove
- 29 (10%) are installed in existing boats as a new installation.

### **What is the state of the market in solid fuel stoves?**

- 44% believe it to be static
- 38% say it is decreasing (most believe the use of oil-fired appliances is growing)
- 18% think it is increasing.

### **Are manufacturers supplying installation instructions relevant to boats?**

73% of companies say no

From a total of 27 identified stove models, three were acknowledged as being provided with relevant installation instructions.

### **Do you know of or consider there to be standards or codes for such installations?**

- 88% of members stated that they were not aware of any such standards.
- One company believed there was
- Remainder made reference to the Recreational Craft Directive, the Boat Safety Scheme, and ISO10239 (Small craft - LPG systems), which are considered not to be specifically relevant to solid fuel stove installation and use in boats.

The majority of companies reported that they use 'common sense and experience' to install solid fuel appliances. However a number of common specific installation parameters were cited by a number of correspondents including:

- securing stoves down
- substantial hearths
- tiling the hull sides (and cabin sides in two replies)
- using heat resistant board
- cabin ventilation to BSS standards.

27 per cent of CBA companies stated that they had experienced varying degrees of incidents with solid fuel appliances over the last five years, mostly relating to scorching or fire. Most were unable to provide specific details.

### **Manufacturers, the market, models, and 'installation & use' information**

CBA members and general consultees identified around 27 main models of stove regularly installed in boats. Approximately 60 per cent of these models are produced by mainstream manufacturers predominantly producing for the domestic market, with the remaining 40 per cent being manufactured or supplied by companies and individuals predominantly interested in the marine market.

All of the stoves identified as being made by manufacturers predominantly producing for the domestic market are supplied with 'installation and use' instructions. The installation advice is usually based on the Building Regulations Approved Document J, but it is not generally relevant or workable for stove installation in narrowboats. The 'use and maintenance' sections of such information are however, generally considered to be as applicable to marine installations as domestic installations.

Of the stoves categorised as predominantly being manufactured for marine use only two have been identified as being provided with 'installation and use' instructions specific to boats. In general other individual stoves within this category do not appear to be provided with any specific instructions, although one of the largest retail suppliers includes an outline of basic

good practice installation and maintenance advice in their catalogue, and basic operating instructions for two of their stoves.

## **Standards, regulations and other requirements: manufacture, installation and general information**

Since 2001 there has been a UK adopted European Standard (BS EN 13240:2001) which covers the manufacture of solid fuel room heaters for domestic use. This standard replaces an existing British Standard (BS3378). Heating Equipment Testing & Approval Scheme Ltd (HETAS)<sup>11</sup> believes that a significant number of stoves manufactured for the domestic market do not comply with, or have not been tested against, either BS3378 or BS EN13240.

No recognised UK standards or codes of practice currently exist that specifically cover the manufacture or installation of solid fuel stoves for marine use. Furthermore, the respondents' replies indicate that stoves predominantly produced for the marine market have, in general, not been produced or tested under either of the two domestic standards.

Since 1<sup>st</sup> April 2002 domestic consumers wishing to have a solid fuel appliance (or a replacement for an existing appliance) installed in their dwelling must obtain Building Control approval from their local authority, or use a competent installer to undertake the works. The relevant Building Regulation (for England and Wales) for domestic dwellings is 'Approved Document J – Combustion appliances and fuel storage systems', current version 2002.

HETAS also referred to the BS6762: Part 2 (Code of practice for the installation of solid fuel fired heating in park homes and transportable accommodation units) acknowledging that currently no installation standards exist applicable to marine use, but that there could be an analogy with such vehicles/units. However BS6762 Part 2 confirms that the requirements of BS4626 and BS4989 do not permit the installation of solid fuel fired heating appliances in touring trailer caravans, holiday caravans or motor caravans.

Research was not successful in identifying any standards covering the installation of solid fuel stoves for marine use within continental Europe and North America.

## **Consumer Protection Legislation**

The General Product Safety Regulations 1994 came into force on 3<sup>rd</sup> October 1994, and implement the safety provisions of the General Product Safety Directive (92/59/EEC) into UK Law. The Regulations relate to the supply of a wide range of products, both new and second-hand and apply to all persons in the business supply chain who are established within the UK and supply goods in the UK.

Suppliers (producers and distributors) have responsibilities to supply only products which are safe, and to undertake relevant activities to help ensure that a product remains safe throughout its reasonably foreseeable period of use. The Regulations also require producers and distributors to take steps to ensure that the products they supply are safe, to provide consumers with relevant information and warnings, and to keep themselves informed about the risks.

A breach of the Regulations can only be decided by a Criminal Court. However Trading Standards Officers advise that it may be an offence for a business to manufacture, distribute and/or install solid fuel stoves into boats where no, or inadequate, installation and use instructions are provided to the consumer. A similar offence may occur where stoves are being

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<sup>11</sup> HETAS is the official body recognised by government to Approve solid fuel domestic heating appliances, fuels and services.

supplied and installed that have an unsafe heat output rating for use within a confined environment, and where safe flue arrangements cannot be constructed.

## **Conclusions concerning findings**

There are a substantial number of stoves fitted to boats navigating inland waters in the UK. The market for stoves is not appreciably diminishing.

Claims on insurance policies and investigations by surveyors or loss adjusters indicate there are a significant number of incidents relating to solid fuel appliances. These exceed the incidents relating to solid fuel stoves recorded by the BSS on behalf of the navigation authorities.

The main contributing factors to fire related incidents appear to include:

1. Inadequate hearth sizes
2. Inadequate separation of combustible materials from stove sections (including the misconception that ceramic tiles act as a heat shield)
3. Poor maintenance of stove and flue pipes
4. Inappropriate fuel used
5. Inappropriate use of stove.

The main contributing factors to CO related incidents appear to include:

1. Inadequate cabin ventilation
2. Short length flue pipes/restricted bore flue pipes
3. Inadequate maintenance of stove
4. Inappropriate modifications to stove and flue systems
5. Inappropriate use of stove.

No national or international agreed standards exist for installation, maintenance or use of solid fuel stoves in marine situations. A vessel's safe condition in regard to a solid fuel installation cannot be accurately verified, as there is no agreed description of a safe installation.

The supply of instructions for installation or use of solid fuel stoves in boats is patchy. Suppliers and installers have a duty to their customers under General Product Safety Regulations 1994 to provide appropriate guidance as to choice of stove and instructions for its installation and use.

The committee members of the Scheme have been presented with these findings for their consideration. The committees will develop recommendations on the basis of these findings.

It is envisaged that others outside of the navigation authorities / BSS may wish to take forward actions to develop an installation and use code of practice. The BSS will be happy to support this but will not take ownership of the process.