

**RECORDS OF
STEAM BOILER
EXPLOSIONS**

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Records of Steam Boiler Explosions by Edward Bindon Marten

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EDWARD BINDON MARTEN

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STEAM BOILER EXPLOSIONS,

BY

EDWARD BINDON MARTEN,

MEM. INST. OF MECHANICAL ENGINEERS; ASSOCIATE OF INSTITUTION OF

CIVIL ENGINEERS, AND CHIEF ENGINEER TO THE

MIDLAND STEAM BOILER INSPECTION AND ASSURANCE CO.

LONDON;

E. & F. N. SPON, 48, CHARING CROSS.

STOURBRIDGE:

R. BROOMHALL, 148, HIGH STREET.

1872.

186. e. 62.

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in the context of public administration and government operations. The text notes that without reliable records, it becomes difficult to track the flow of funds, assess performance, and identify areas for improvement.

2. The second part of the document outlines the various methods and tools used for data collection and analysis. It highlights the need for standardized procedures to ensure consistency and reliability of the data. The text mentions the use of surveys, interviews, and focus groups as primary data collection methods, while secondary data is often obtained from existing reports and databases. The analysis phase involves identifying trends, patterns, and correlations within the data, which helps in understanding the underlying causes and effects of the phenomena being studied.

3. The third part of the document focuses on the interpretation and communication of the findings. It stresses that the results of the research should be presented in a clear, concise, and accessible manner. The text suggests using a variety of visual aids, such as charts, graphs, and tables, to enhance the understanding of the data. Additionally, it emphasizes the importance of providing context and background information to help the audience interpret the findings correctly. The final part of the document discusses the implications of the research and the steps that should be taken to address the identified issues and improve the system.

PREFACE.

ACCURATE information as to Boiler Explosions must always be useful to those who are interested in the safe working of Steam Boilers.

The following pages contain very brief abstracts of records obtained for the Midland Steam Boiler Inspection and Assurance Company, by whose permission they are now republished in a compact and convenient form.

By permission of the Council of the Institution of Mechanical Engineers, the records are prefaced by a Paper on Steam Boiler Explosions and their records, and on Inspection as a means of prevention, read before that Institution at Manchester, August 1st, 1866, and a further Paper on the "Conclusions derived from the experience of recent Steam Boiler Explosions," read before the same Institution at Nottingham, August 3rd, 1870.

All names of Works or Firms are omitted from the records as unnecessary.

ON STEAM BOILER EXPLOSIONS AND THEIR RECORDS, AND ON
INSPECTION AS A MEANS OF PREVENTION, BY EDWARD B. MARTEN,
MEM. INST. M.E. A.I.C.E., EXCERPT MINUTES OF PROCEEDINGS OF THE
MEETING OF THE INSTITUTION OF MECHANICAL ENGINEERS, AT
MANCHESTER, 1ST AUGUST, 1866, JOSEPH WHITWORTH, ESQ.,
PRESIDENT, IN THE CHAIR. BY PERMISSION OF THE COUNCIL.

THE subject of Steam Boiler Explosions, which was brought before this Institution in June, 1848, in a paper by the late Mr. William Smith of Dudley in reference to an explosion near that place, and again in 1859 in a paper by Mr. Longridge on the economy and durability of stationary boilers, is one of great importance and is now attracting increased attention. The first public notice of the subject was by a parliamentary committee in 1817, which was appointed in consequence of a very fatal boiler explosion in London in 1815; evidence was then collected as to steamboats, and many boiler explosions were referred to. That committee recommended among other things that boilers should be made of wrought iron, instead of cast iron or copper, which had been the materials mainly used previously; that they should be inspected and tested; and that there should be two safety valves, each loaded to one third of the test pressure, under penalties for any excess. A great part of the information now existing upon the subject, especially in regard to the earlier explosions, is to be found in the records of inquests after fatal cases; and some of the careful reports of eminent engineers on those occasions have materially assisted in the formation of correct views as to the causes of explosion. Latterly also the printed reports of the inspectors of mines, and more especially the reports of the explosions of locomotives, illustrated by diagrams by the inspectors of railways, have furnished very valuable information. Since the subject has been taken up by private associations for the

prevention of explosions, many more records have been published, although their usefulness is much impaired by their not containing the names of the places whereby the explosions could be identified.

When the writer's attention was first directed to this subject, he met with great difficulty in obtaining correct records of boiler explosions, from which to arrive at the results of past experience; and wishing to base his own opinion on facts, rather than on the inferences of others however reliable, he followed the example of the Franklin Institute in their elaborate investigation of the subject, and collected all the records he could find; and by way of facilitating reference, arranged an index, a manuscript copy of which is presented with the present paper to the Library of this Institution. All must be agreed as to the importance of reliable information on such accidents as boiler explosions; and the writer would suggest that this Institution may materially aid in obtaining the desired records and placing them within easy access, by becoming the depository of reports on explosions, and by inducing those who have the opportunity to forward copies of reports, that these may be arranged so as to be easily found and consulted. It is very desirable that these reports should as far as possible be illustrated by sketches, as aids to the description; and also by slight models like those now shown to the meeting, by which the whole matter may be seen at a glance. So few persons comparatively have the opportunity of examining boilers after explosion, that the most erroneous ideas have prevailed, and theories have been advanced which would soon be dissipated by practical experience or by reading accurate reports. It would also very much aid in the understanding of published matter on the subject, if full descriptions of each case alluded to in illustration could be obtained. These records are as useful to the engineer as the "precedents" or "cases" to the lawyer or the surgeon. After any serious explosion, the newspapers of the neighbourhood in which it has occurred contain voluminous articles describing the disastrous result and the damage done, which, although useful as far as they go, do not in the least assist in arriving at the cause of explosion. The really important particulars, such as the description

and construction of the boiler, its dimensions, and the pressure at which it worked, are in most cases omitted altogether.

The record of explosions presented to the Institution contains a list of the boiler explosions in each year of the present century, as far as known to the writer, with the names of the places, and the description and sizes of the boilers, and the supposed cause of explosion, together with references to the books or papers from which further information may be obtained. Of course many of the explosions have to be put down as uncertain in some of the particulars; but every year improves the record, as fresh information is obtained, and with the assistance of the members of this Institution it might be made far more perfect and extensive.

The total number of explosions here recorded is 1046, and they caused the death of 4076 persons and the injury of 2903. The causes assigned for the several explosions are very numerous, and are no doubt incorrect in many cases; but they may be generally stated as follows:

- 397 are too uncertain to place under any heading; but of the rest 145 were from the boilers being worn out, or from corrosion, or from deteriorated plates or rivets.
- 137 from over pressure, from safety valves being wedged or overweighted, in some cases intentionally, or from other acts of carelessness.
- 125 from faulty construction of boiler or fittings, want of stays, or neglect of timely repair.
- 119 from collapse of internal tubes, generally from insufficient strength.
- 114 from shortness of water, or from scurf preventing the proper contact of the water with the plates; or from improper setting so as to expose the sides of the boiler to the flame above the water line.
- 9 from extraneous causes, such as effect of lightning striking down the stacks upon the boilers, or from fire in the building or explosion of gas in the flues.

1046 total number of explosions.