

HEALTH AND SAFETY EXECUTIVE

RESEARCH AND LABORATORY SERVICES DIVISION

Broad Lane, Sheffield S3 7HQ

The Hillsborough Incident 15 April 1989:
A compendium of the Technical Aspects
of the Incident Investigation by the
Health and Safety Executive

by

C E Nicholson PhD CEng MIM

IR/L/ME/MM/89/2

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1 INTRODUCTION

- 1.1 Following an incident on 15 April 1989, I visited Sheffield Wednesday Football Club's (SWFC) Hillsborough Stadium on 16 April 1989 at the request of Mr M S Nattrass, Area Director of South Yorkshire and Humberside Factory and Agricultural Inspectorate of the Health and Safety Executive (HSE). Subsequently I was appointed to head the HSE team investigating the incident following correspondence between the Court of Inquiry and the then Deputy Director General of the HSE, Mr J D G Hammer.
- 1.2 The HSE's Research and Laboratory Services Division (RLSD) consists of 3 laboratories, one of which, the Safety Engineering Laboratory (SEL), is based in Sheffield. As a Deputy Director in the Sheffield Laboratory, I was able to assemble a team of scientists and engineers from various specialist sections to tackle the various technical problems which arose. I was also assisted by members of HSE's Technology Division in much of the on site investigation at the Hillsborough ground. They produced site reports, which are reproduced in the Annexe, and which have been utilised by HSE staff throughout this investigation.

In considering collapse load calculations of barrier 124A, Professor R A Smith of the University of Sheffield Department of Mechanical and Process Engineering, acted as a consultant and in conjunction with RLSD staff produced a report on this topic.

- .3 A few days after the incident, the West Midlands Police were appointed to assist the Inquiry and all the initial stages of the investigation were carried out in close collaboration with ACC M Jones of the West Midlands Police. When the Inquiry assessors were appointed, the direction of technical aspects of the investigation was then planned with Professor L Maunder of the University of Newcastle Department of Mechanical Engineering, but still in collaboration with ACC Jones.
- 1.4 A summary report of HSE's findings "The Hillsborough Incident 15 April 1989: An Investigation into Various Technical Aspects prepared for the Court of Inquiry" by C E Nicholson, Report No IR/L/ME/MM/89/1 was written and presented to the Court of Inquiry in June 1989.
- 1.5 This compendium of reports contains details of examinations performed on site and in the laboratory. The work was carried out by me, by other staff of HSE and by the consultant Professor Smith, working on my instructions and under my general supervision.

2 REPORTS

The following is a list of reports contained within this compendium. All authors are staff of HSE's Research Division except where noted.

- 2.1 Examination of Crush Barriers from Pens 3 and 4
by P F Heyes and J G Tattersall
Report No IR/L/MM/89/11
- 2.2 Collapse Load Calculations for Barrier 124A
by Professor R A Smith, University of Sheffield and G A C Games
Report No IR/L/ME/89/36
- 2.3 An investigation into the number of people in Pens 3 and 4
by G Norton
Report No IR/L/ME/89/32

- 2.4 An estimation of the maximum allowable capacity of Pens 3 and 4
by A L Collins and D Waterhouse
Report No IR/L/ME/89/35
- 2.5 An investigation of the turnstiles at the Leppings Lane entrance to the
stadium
by G A C Games and D Waterhouse
Report No IR/L/ME/89/33
- 2.6 An investigation into the number of people entering the stadium through
turnstiles A to G and through Gate C
by G A C Games
Report No IR/L/ME/89/34
- 2.7 Audibility of the Public Address System at Hillsborough Football Ground
by I R Price
Report No IR/L/NV/89/17

3 ANNEXE

These are three Field Consultant Group (FCG) Inspector reports produced by specialist inspectors from HSE's Technology Division (TD) following their on site investigations of barriers, turnstiles and a perimeter brick wall. Also included is an interim report on the measurement of crowd densities and pressures. These four reports were prepared in the immediate aftermath of the incident and contain the best information available at the time.

- 3.1 Condition of outer perimeter wall by C J Pertee TD
- 3.2 Examination of turnstiles A-G by J B Hibbs TD
- 3.3 Examination of Crush Barriers, Leppings Lane End, Central Pen by J B Hibbs TD
- 3.4 Interim Report (Minute to Dr C E Nicholson)
Crowd densities and pressures by M James TD.