3. Overhead Line Equipment

3.1 About a quarter of the OLE failures were due to malicious actions usually involving the throwing of ropes or cables over the equipment. With a potential of 25 kV these vandals are not only putting their own lives at risk but are jeopardising the lives of anyone who unwittingly attempts to remove the obstruction.

3.2 The following incidents, although not associated with vandalism, are nevertheless noteworthy.

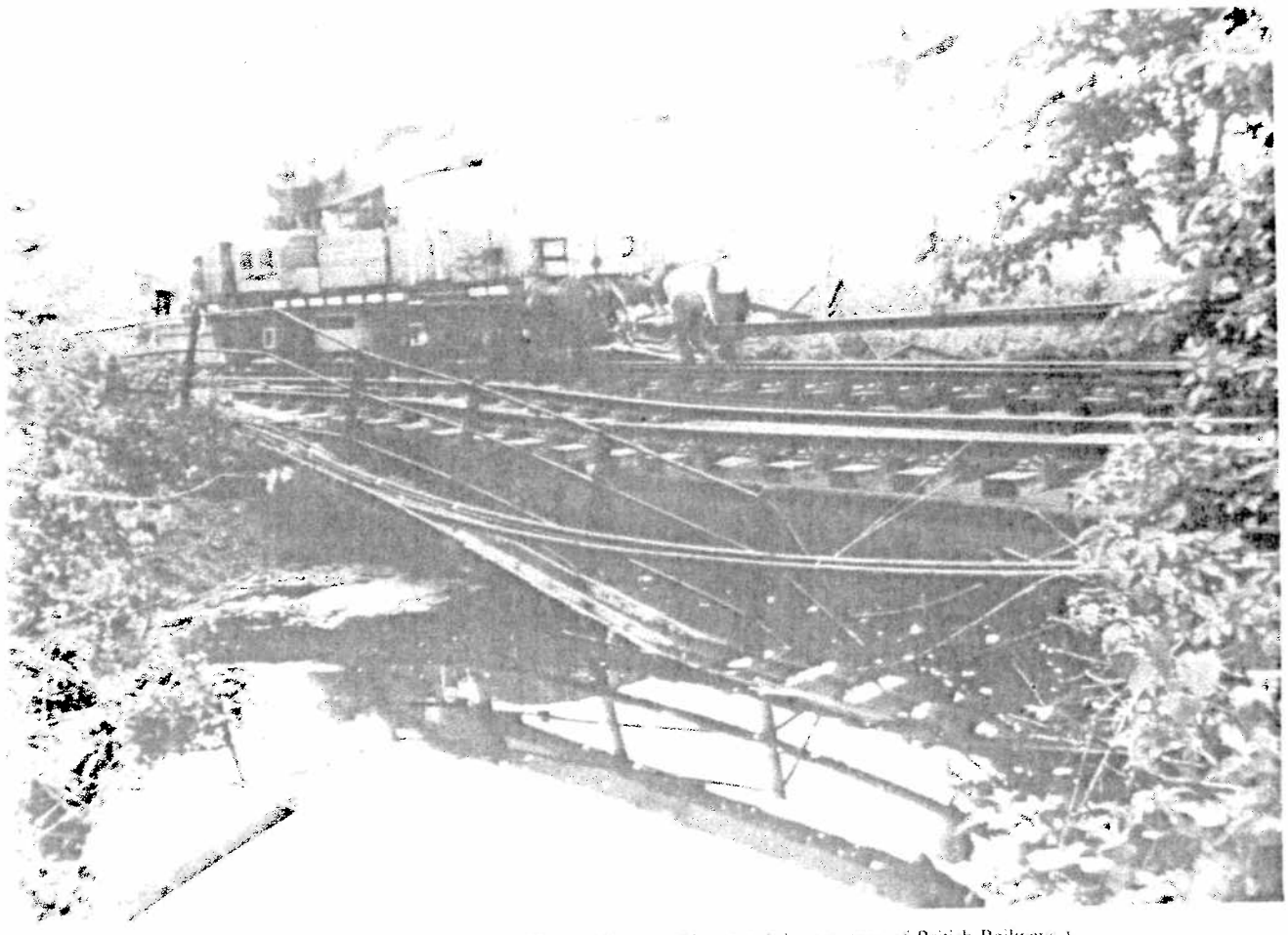
3.3 During a publicity exercise for an exhibition train at *Leeds (ER)* on *27 July*, tables and parasols were laid out on the platform. A high wind blew one of the parasols on to the OLE where it burst into flames. A staff member on the exhibition train had to be restrained from climbing on to the train in order to retrieve it.

3.4 Netting or sheets on wagons touched the OLE at *Werrington Junction (ER)* on *11 August* and at *Berkhamstead (LMR)* on *7 September* which disrupted the service on both occasions.

4. Formation and Structural Failures

4.1 There were four recorded failures to the formation and structures, of which three were the collapse of culverts at *Leominster (WR)* on *24 March*, *Tyndrum (ScR)* on *29 March* and between *Wrabness* and *Mistley (AR)* on *29 May*. The remaining failure was found during a routine inspection of a bridge on the freight only line between *Sheet Stores Junction* and *Stenson Junction (LMR)* on *11 February*. The arch ring had fractured and bricks had fallen on to the farm track below. Timber shoring was necessary to support the bridge and a temporary speed restriction was imposed until permanent repairs could be carried out.

4.2 Although not classified as a failure but as a train accident because of the resultant derailment of an ECS passenger train (see Chapter III), the collapse of Bridge No 71 between *Wraysbury* and *Sunnymeads (SR)* on *10 May* was potentially the most serious failure of a structure. Bridge No 71 was one of three adjacent bridges which carried the double track line over three



Collapse of a bridge between Wraysbury and Sunnymeads (SR) on 10 May. (Photograph by courtesy of British Railways.)

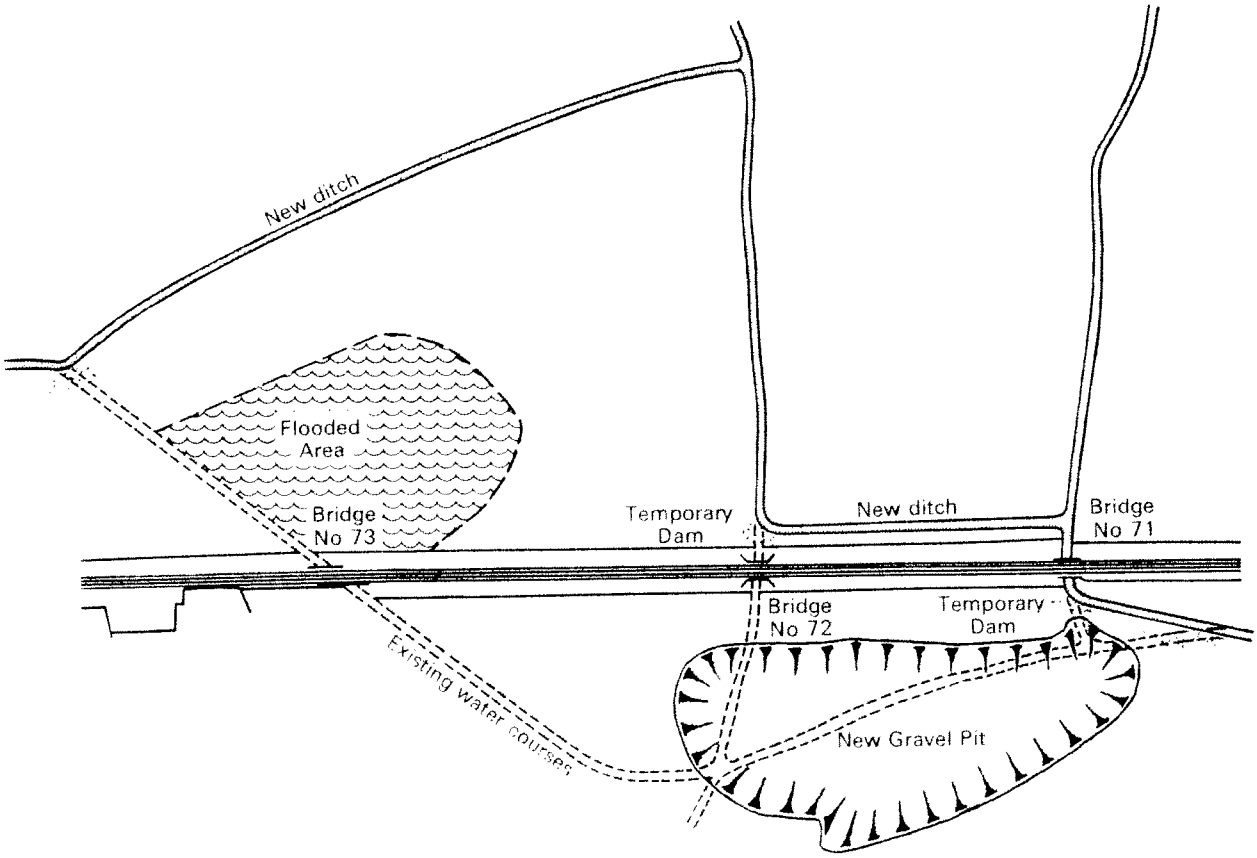
separate water courses. It comprised three trough girder spans each of approximately 3m resting on abutments and two piers built of brick that were founded on sandy gravel overlaid with a thin alluvial clay.

4.3 In 1986, planning application was made for gravel to be extracted from land adjacent to the railway. In order to safeguard the railway, consent was granted on condition that a strip of land 15m wide, measured from the railway's boundary, be maintained at all times. Stockpiling of spoil on this strip should not exceed 2.5m high, have side slopes not exceeding 1:2 (Vertical:Horizontal) and the toe of the spoil bund should have a minimum clearance of 2m from the railway boundary.

4.4 In order to extract the gravel, it was foreseen that diversions were required to be made to the water courses and these were specified in the approved Method of Working. However, during the course of the work, further unsanctioned diversions to the water courses also appear to have been made. Downstream of Bridge No 71, one water course had been diverted into a new ditch, known as the Horton Ditch Diversion that was constructed parallel to the railway and within the 15m wide strip, joined the stream that had flowed under Bridge No 71 and the confluence was diverted into the lower end of the Horton Ditch Diversion. In February 1988, the Horton Ditch Diversion was overtopped which caused a land slip into the gravel pit.

4.5 A new channel was cut to divert the flow of another water course into the channel upstream of Bridge No 71. Excavation of the area adjacent to Bridge No 71 commenced in October 1987 and dewatering of the pit was effected by a submersible pump.

4.6 In the early part of 1988 the flows in the watercourses were considerably higher than usual. Serious flooding was occurring in the fields upstream of the railway. Heavy but localised rain storms on 7 and 8 May created extremely high flows. A breach of the bund between the Horton Ditch Diversion and the gravel workings occurred allowing water to flow directly into the excavation. The velocity of flow occasioned by the head difference of some 8m and the volume of water flowing caused rapid erosion of the gravel slope back towards the railway and Bridge No 71. The bridge failed when the erosion undermined the bridge foundations.



Simplified drainage layout at time of collapse of Bridge no 71 between Wraysbury and Sunnymeads.