

THE IMPORTANCE OF CORROSION AS A CAUSE OF ACCIDENTS

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SUMMARY

An important aspect of improving the safety of process plant is the identification of the causes of hazardous situations and accidents. Often accidents seem to stem from a sequence of unlikely events, but there is always an event which triggers off the sequence and this "primary" cause may be far removed from the final situation, for example in the Flixborough disaster. Corrosion is a common problem and is a possible cause of accidents. We have attempted to quantify the importance of corrosion as a cause of accidents. There are two parts to this question:—

- (a) How frequently does corrosion cause accidents? — or alternatively — What proportion of accidents are caused by corrosion?
- (b) The seriousness of the consequences of accidents caused by corrosion.

We would like to estimate the answer to the first question posed in (a), but this is clearly impossible in this case, since it requires a knowledge of the corrosion 'population'. The best that one can hope to do is determine retrospectively what proportion of accidents were caused by corrosion damage. This tells us how important corrosion is relative to other causes, but does not tell us how "dangerous" it is. How we regard the safety problem presented by corrosion is related to (b) as much as (a). While disasters caused by corrosion are likely to be as serious as disasters from any cause, there may be a larger number of trivial incidents.

In a survey of boiler explosions reported under the Boiler Explosions Acts, 1882 and 1890, from 1947 to 1974 it was found that out of 125 explosions, 21, or 17%, resulted from corrosion. Analysis of these explosions on a quinquennial basis yields the following proportions caused by corrosion: 1946–50, 19%; 51–55, 19%; 56–60, 25%; 61–65, 7%; 66–70, 14%; 71–75, 20%. A survey of major fires and explosions in the chemical industry which were reported in the safety literature revealed that from 1957 to 1974 out of a total of 58 reported incidents only 4, or approximately 7%, could be attributed to corrosion. In general, the number of incidents is too small to place much confidence in the exact figures for the proportion of accidents caused by corrosion, though it would probably be safe to assume that it was about 10%.