

## LPG Explosion Problem

An LPG storage tank installation is sited close to a railway line on which trains pass carrying fuel oil to a power station. If a train derails it may either plough directly into the LPG storage installation or it may overturn with a consequent possibility of the fuel oil catching fire. The fire may cause the LPG installation to explode.

Use the data given below to estimate the frequency of explosion of the LPG storage installation.

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|---|----------------------|
| Number of fuel oil trains per year                                    | 1000                 |
| Derailment frequency per km travelled                                 | $0.4 \times 10^{-6}$ |
| Length of average fuel oil train                                      | 0.5 km               |
| Length of LPG installation next to railway line                       | 0.7 km               |
| Probability that a derailed train overturns                           | 0.5                  |
| Probability that an overturned train catches fire                     | 0.1                  |
| Probability that fire engulfs LPG tanks causing explosion             | 0.2                  |
| Probability that a derailed train hits LPG tanks causing an explosion | 0.05                 |

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