

Appendix 11.2.3

Derivation of Failure Frequencies

length of access road (km)	no. vehicle movements per day	no. of days per year
0.1	10	365

severe car accident per km.year	total distance travelled per year	probability running into gas facility	probability damage to gas holder
6.37E-09	365	0.5	0.5



probability of car crash per year
5.81E-07

probability rupture failure in car crash
0



failure due to car crash per year
0.00E+00

spontaneous failure per year per vessel *	no. of gas holder#
5.00E-06	1

frequency for earthquake per year	probability of failure in earthquake
1.00E-05	0.01



external event failure per year
0.00E+00



spontaneous failure per year
5.00E-06



vessel rupture failure in earthquake per year
1.00E-07



Cold catastrophic failure for vessel per year
5.10E-06

only 1 gas holder in operation at any one time

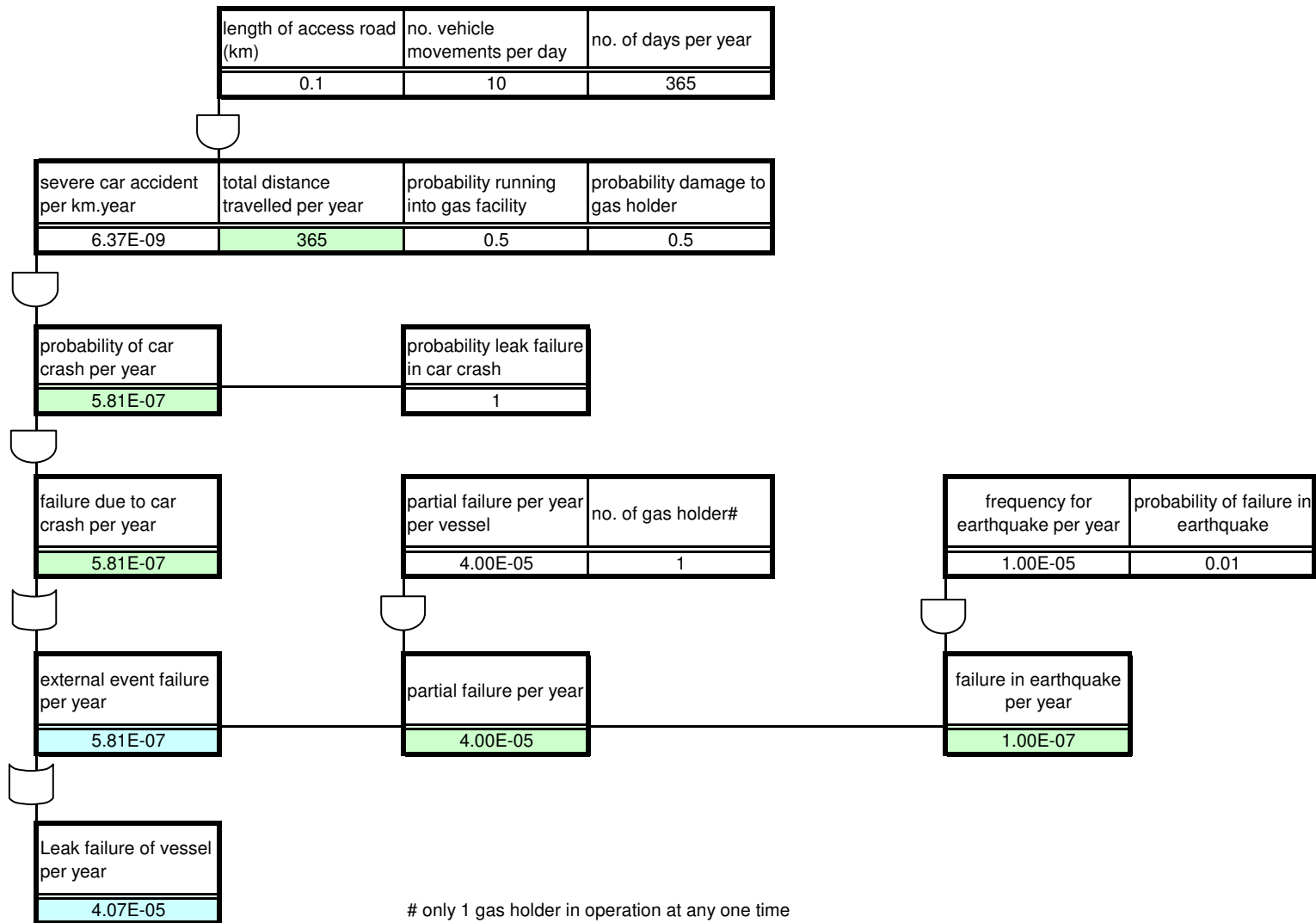


AND gate



OR gate

Cold Catastrophic Failure for Gas Holder

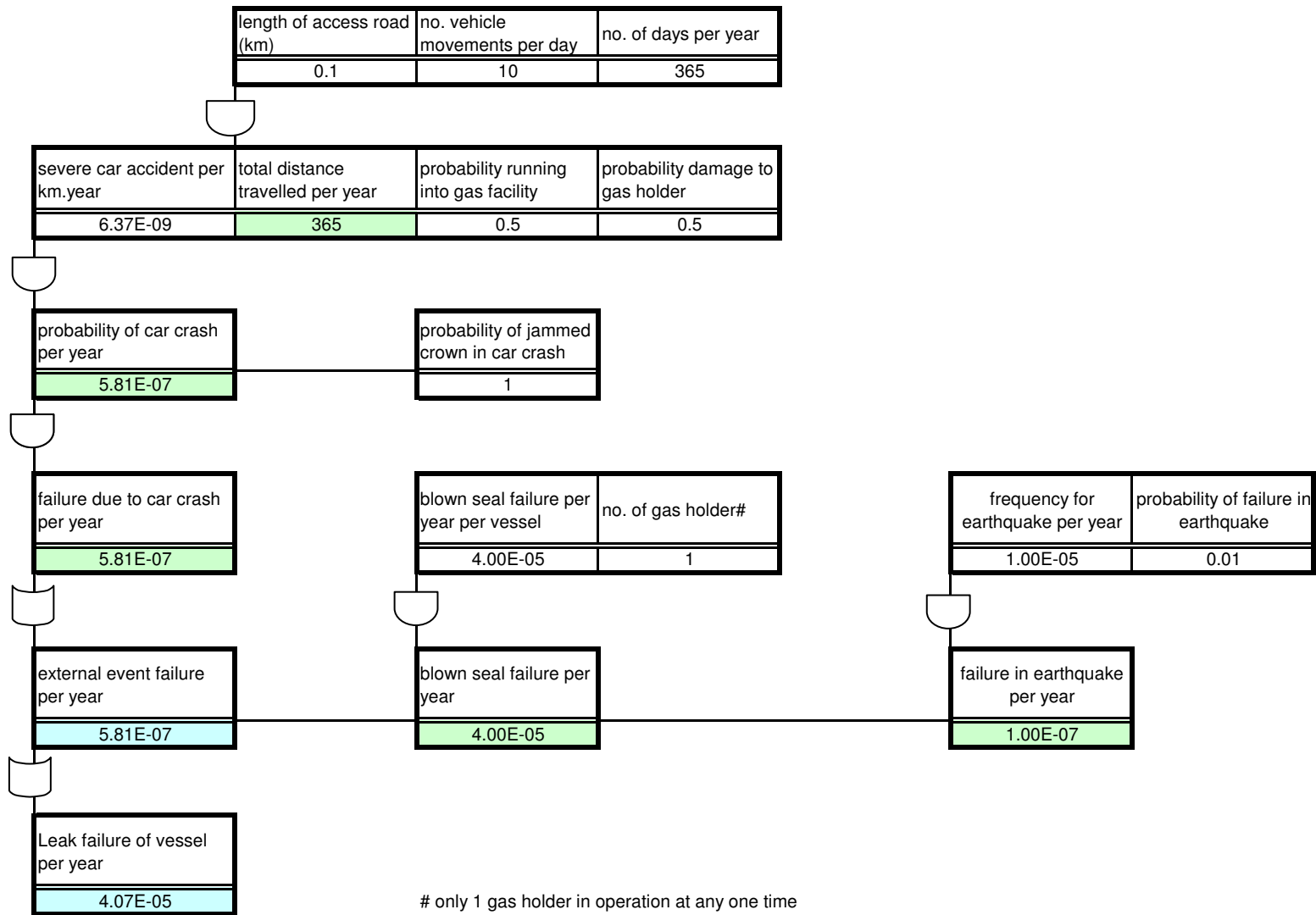


AND gate



OR gate

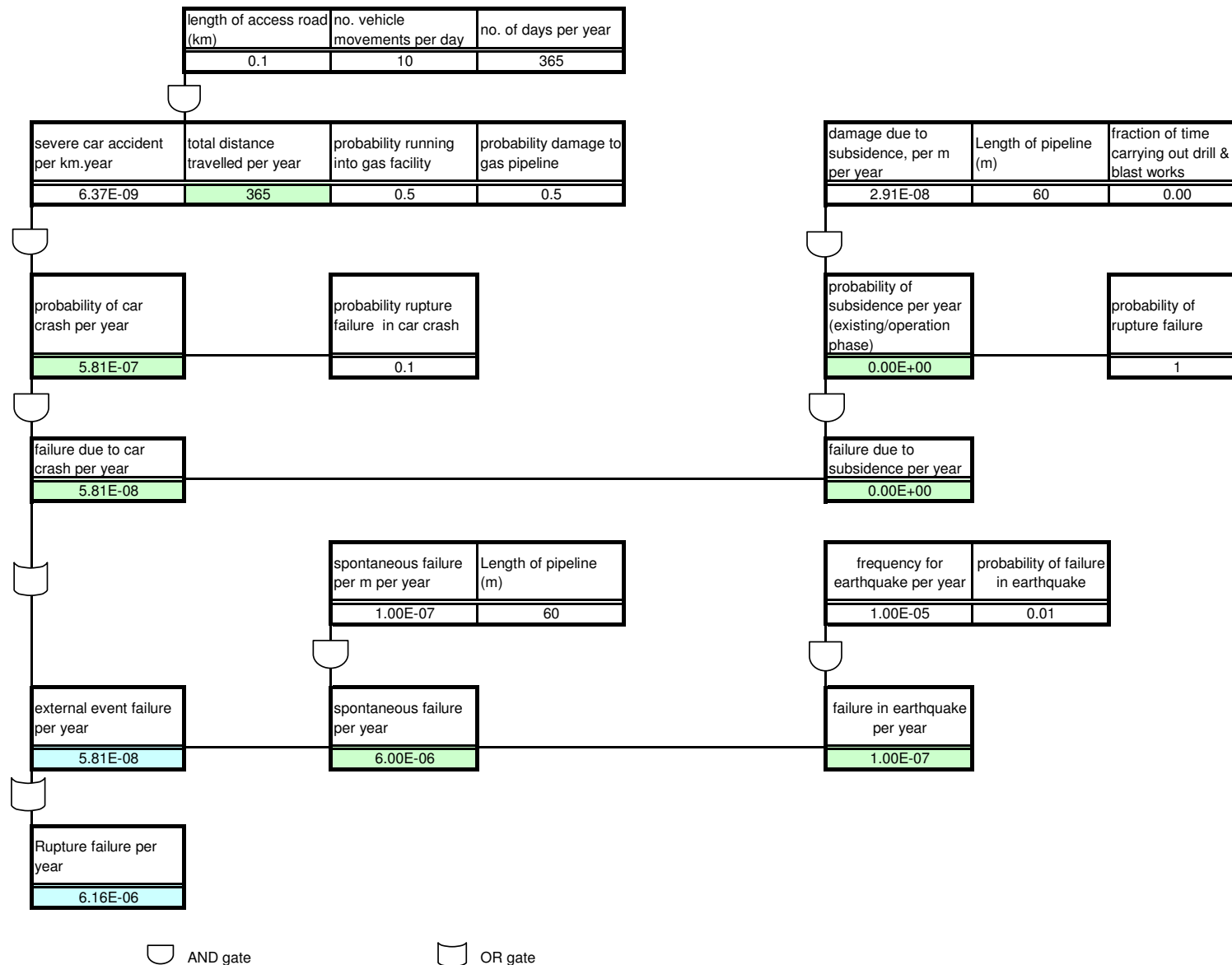
Partial Failure for Gas Holder



AND gate

OR gate

Blown Seal Failure



Rupture Failure for Pipeline (before compressor house)



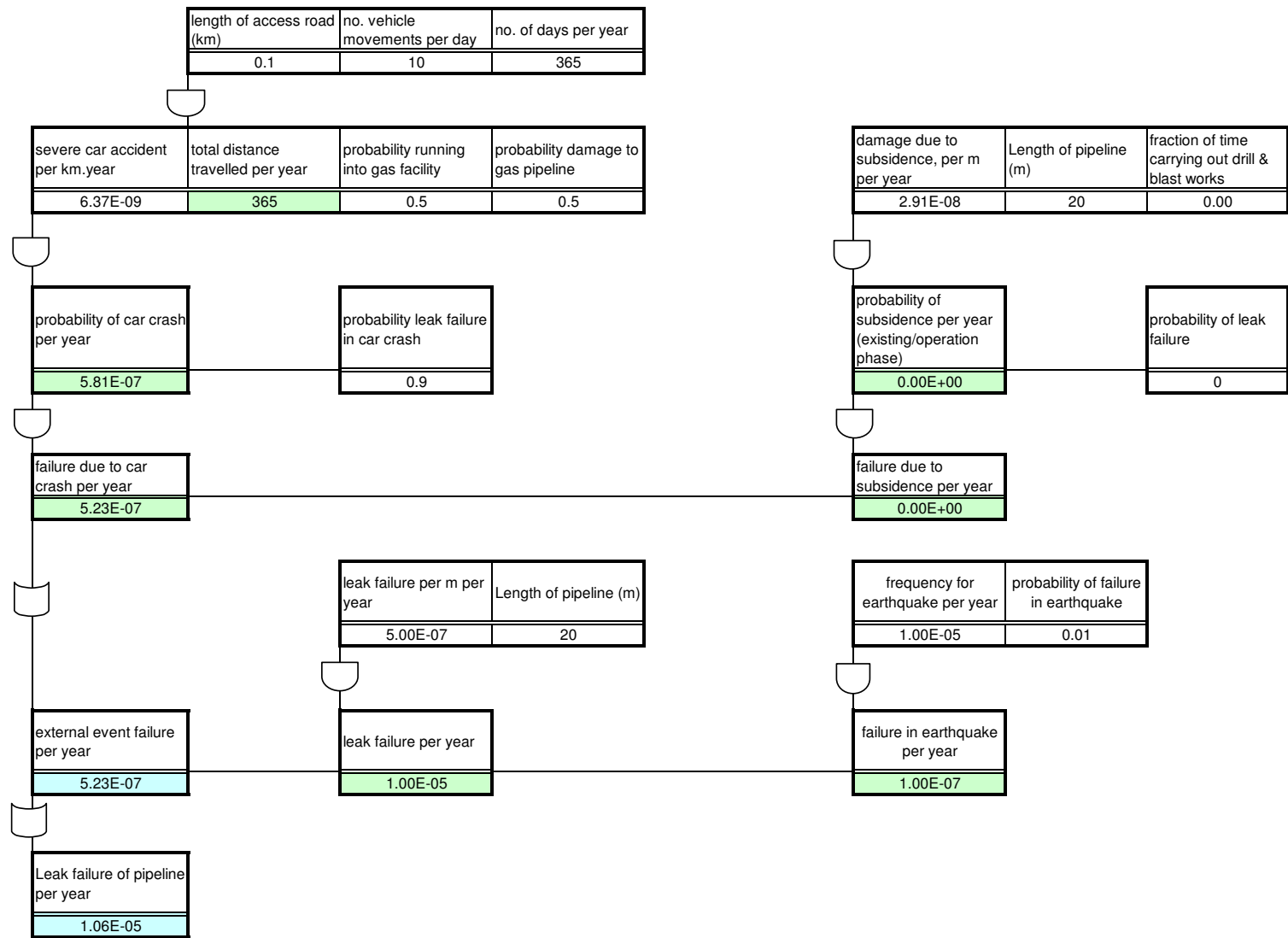
AND gate

OR gate

Leak Failure for Pipeline (before compressor house)



Rupture Failure for Pipeline (outlet section)



AND gate

OR gate

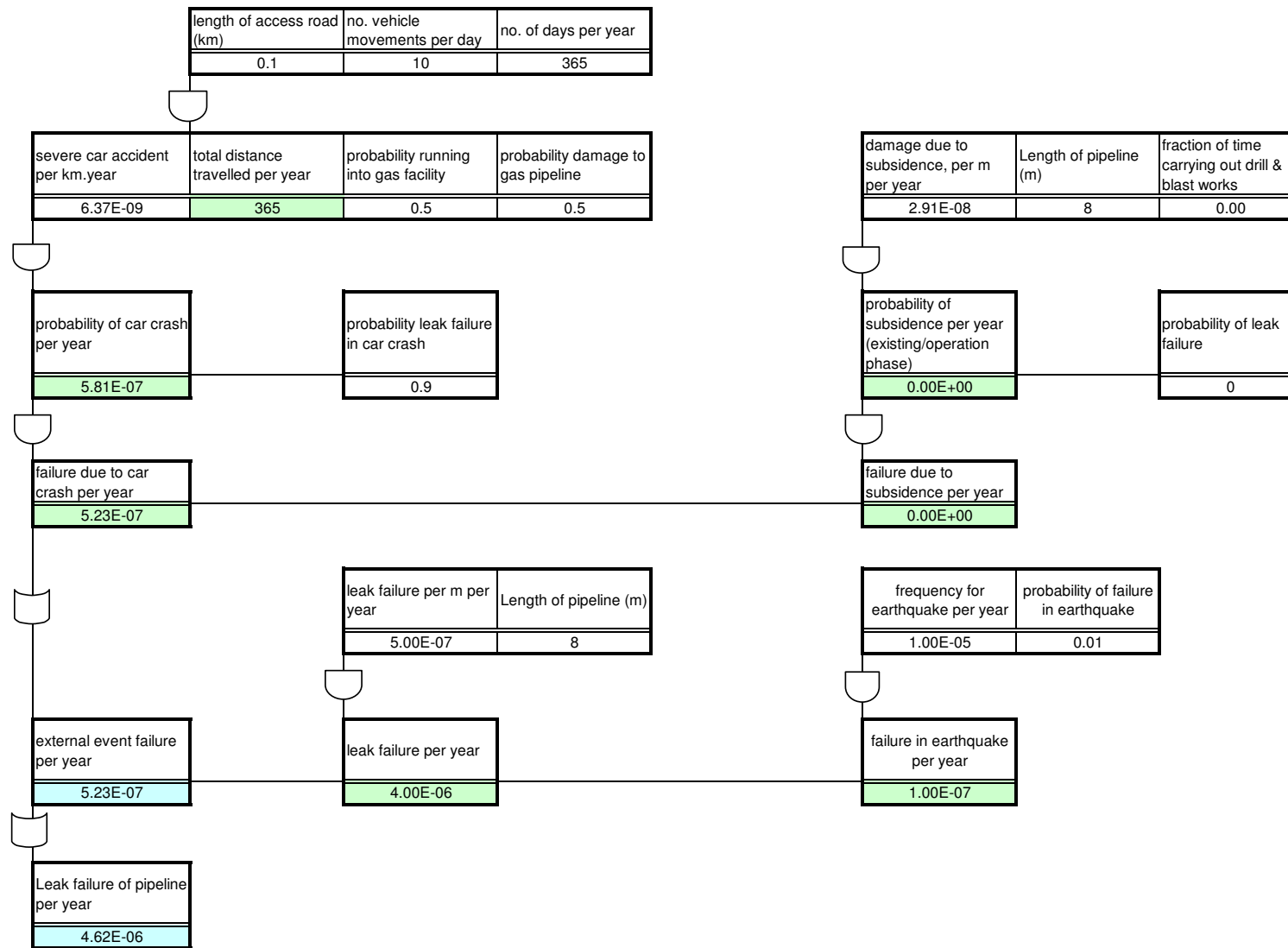
Leak Failure for Pipeline (outlet section)



AND gate

OR gate

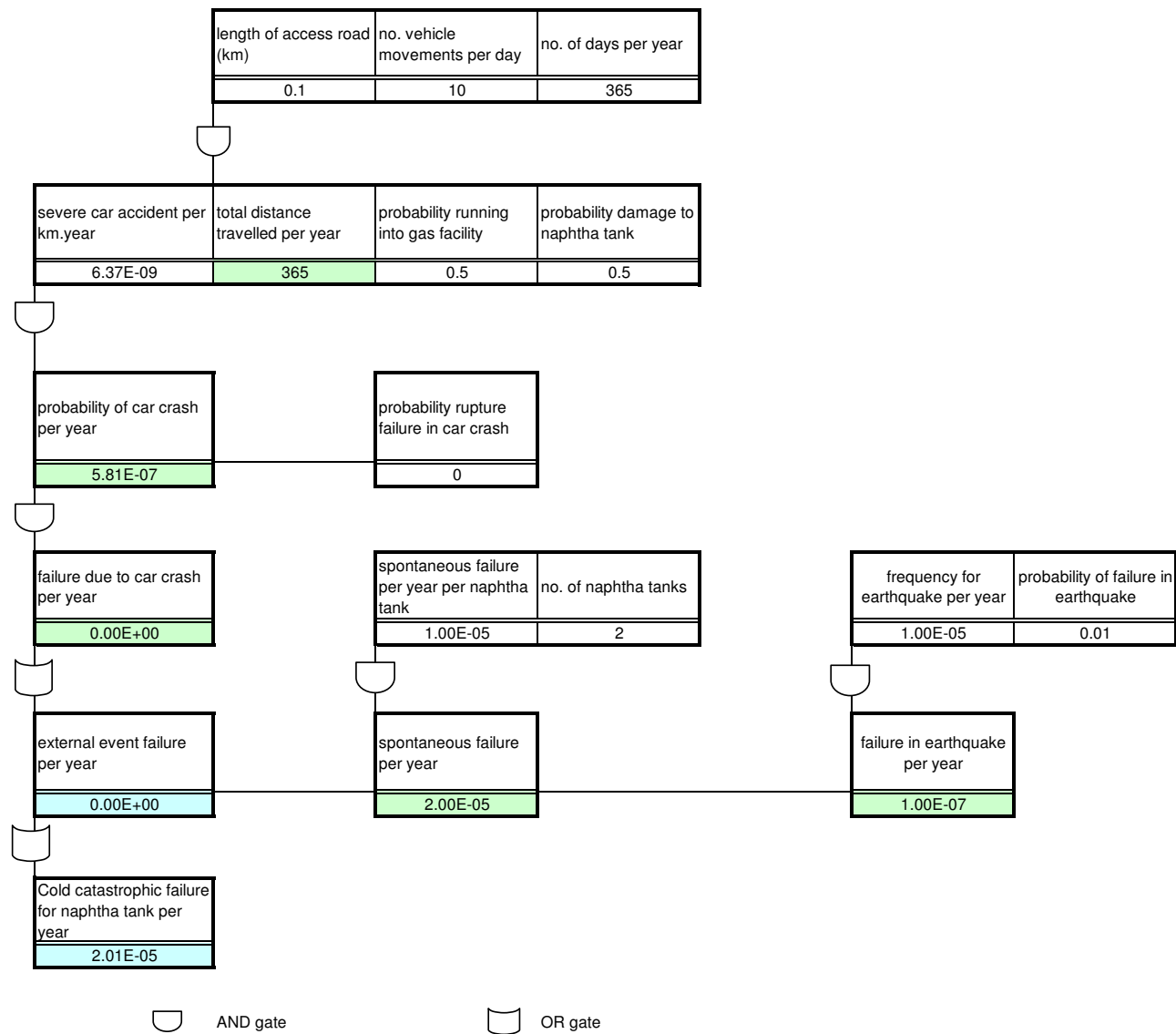
Rupture Failure for Pipeline (offtake/pigging station)



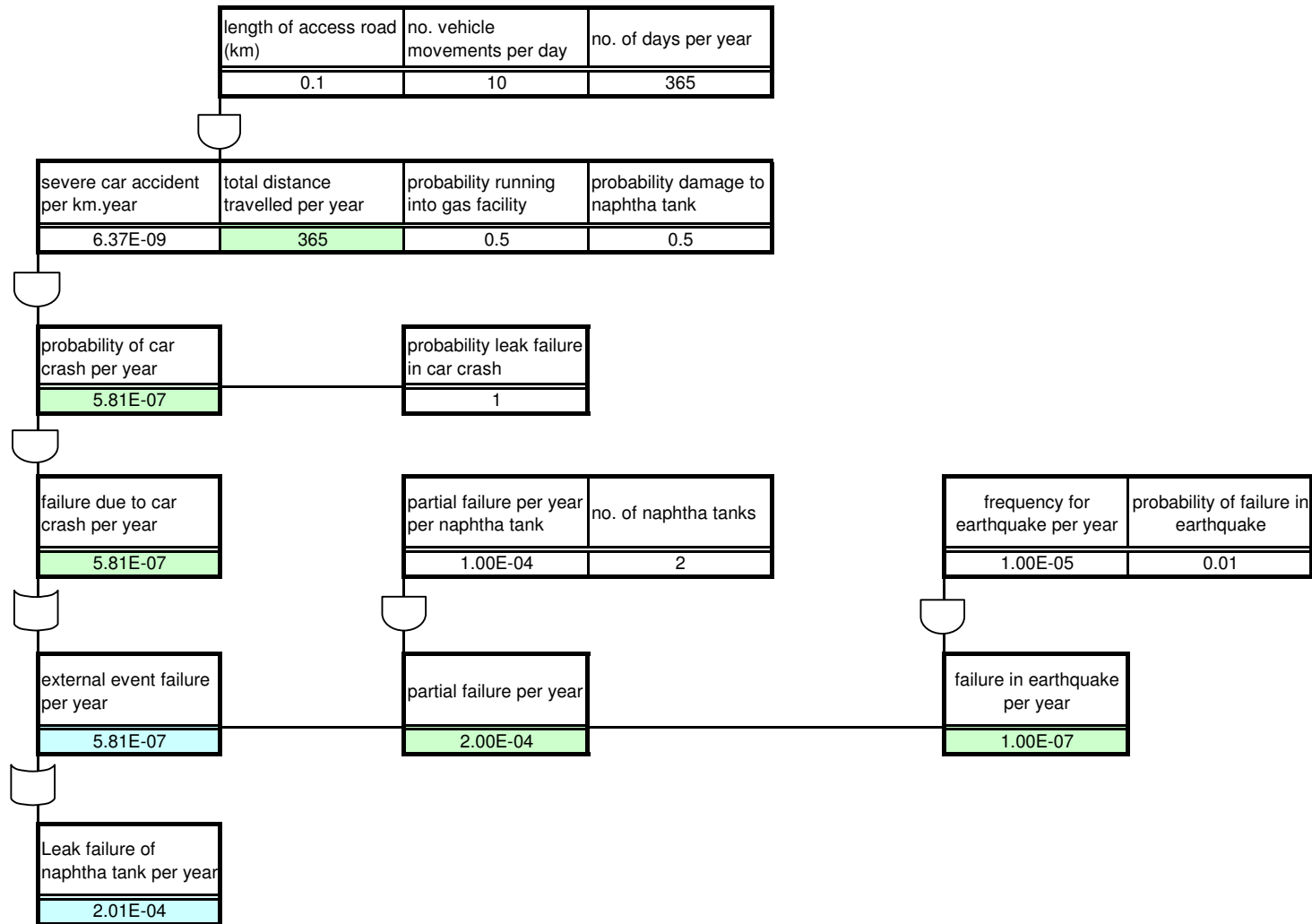
AND gate

OR gate

Leak Failure for Pipeline (offtake/pigging station)



Cold Catastrophic Failure for Naphtha Tank

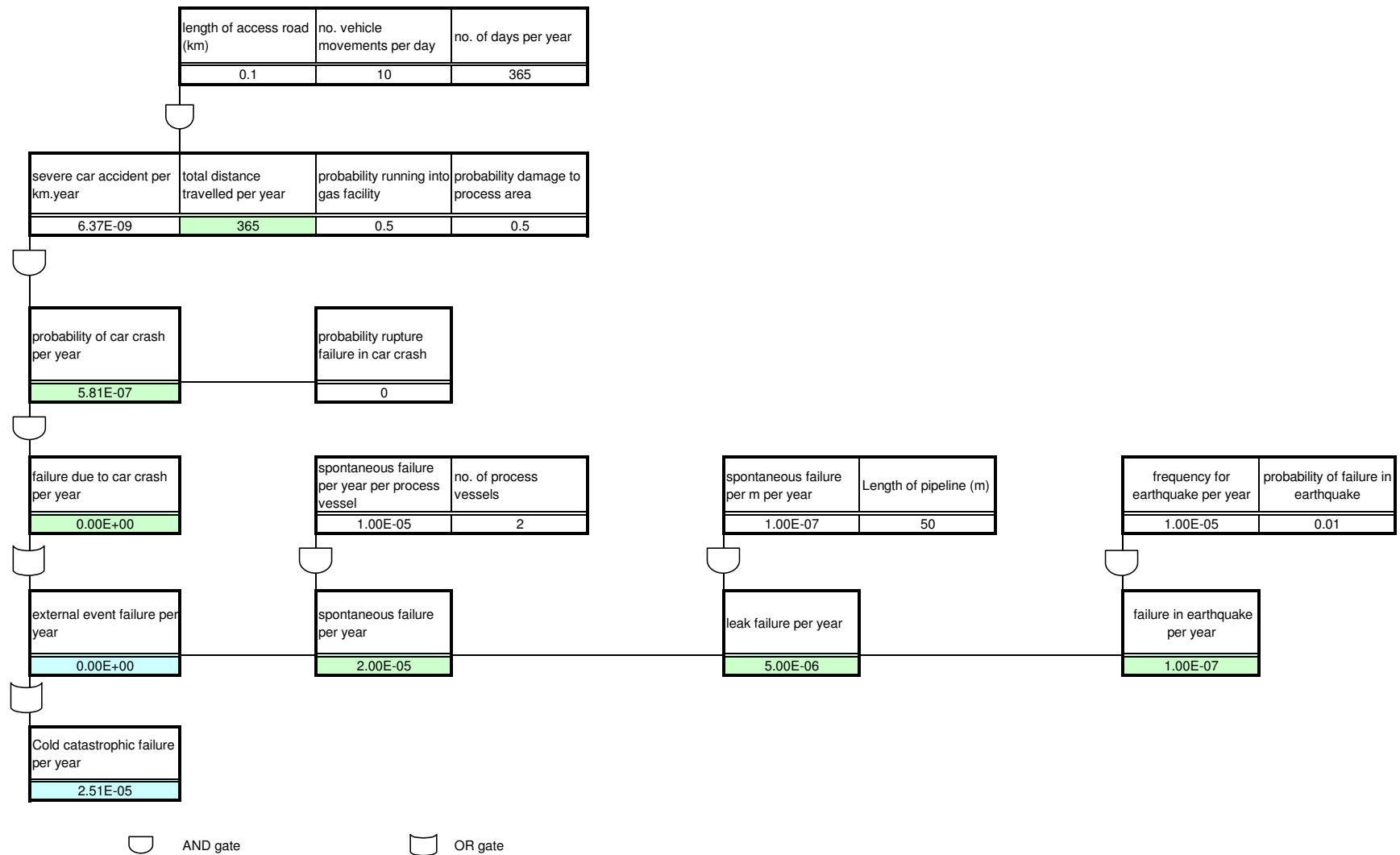


AND gate

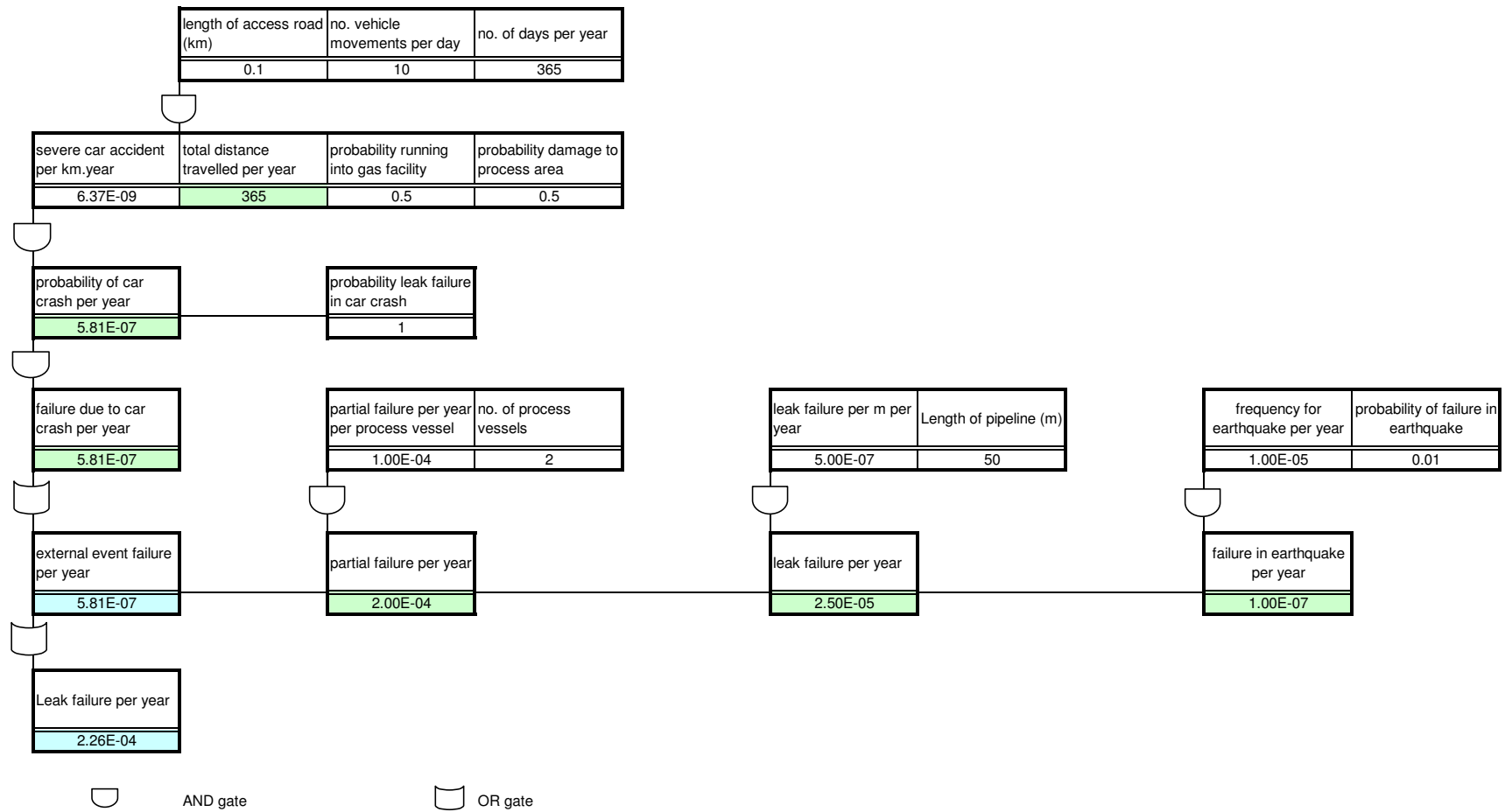


OR gate

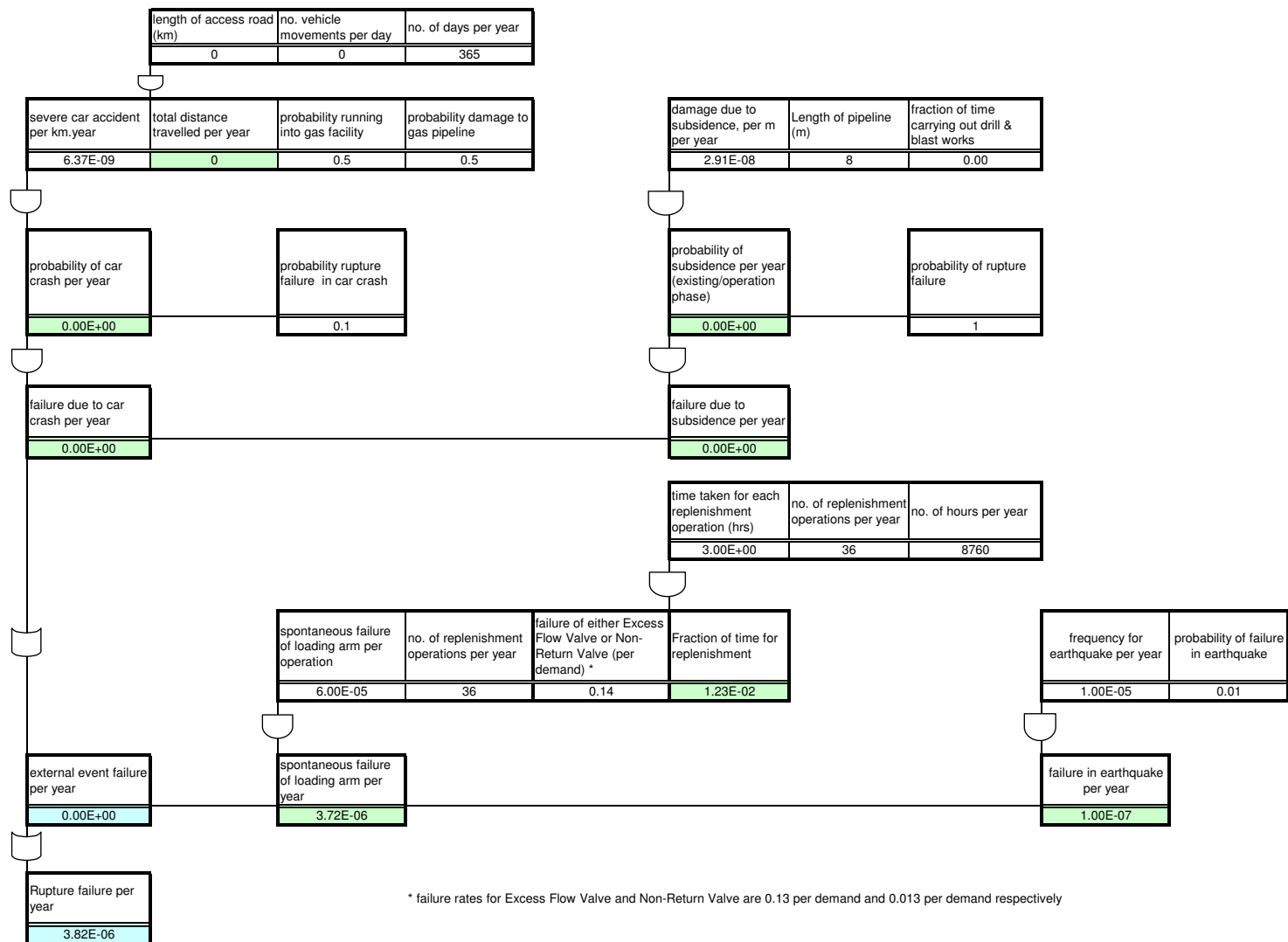
Partial Failure for Naphtha Tank



Rupture Failure at Process Area



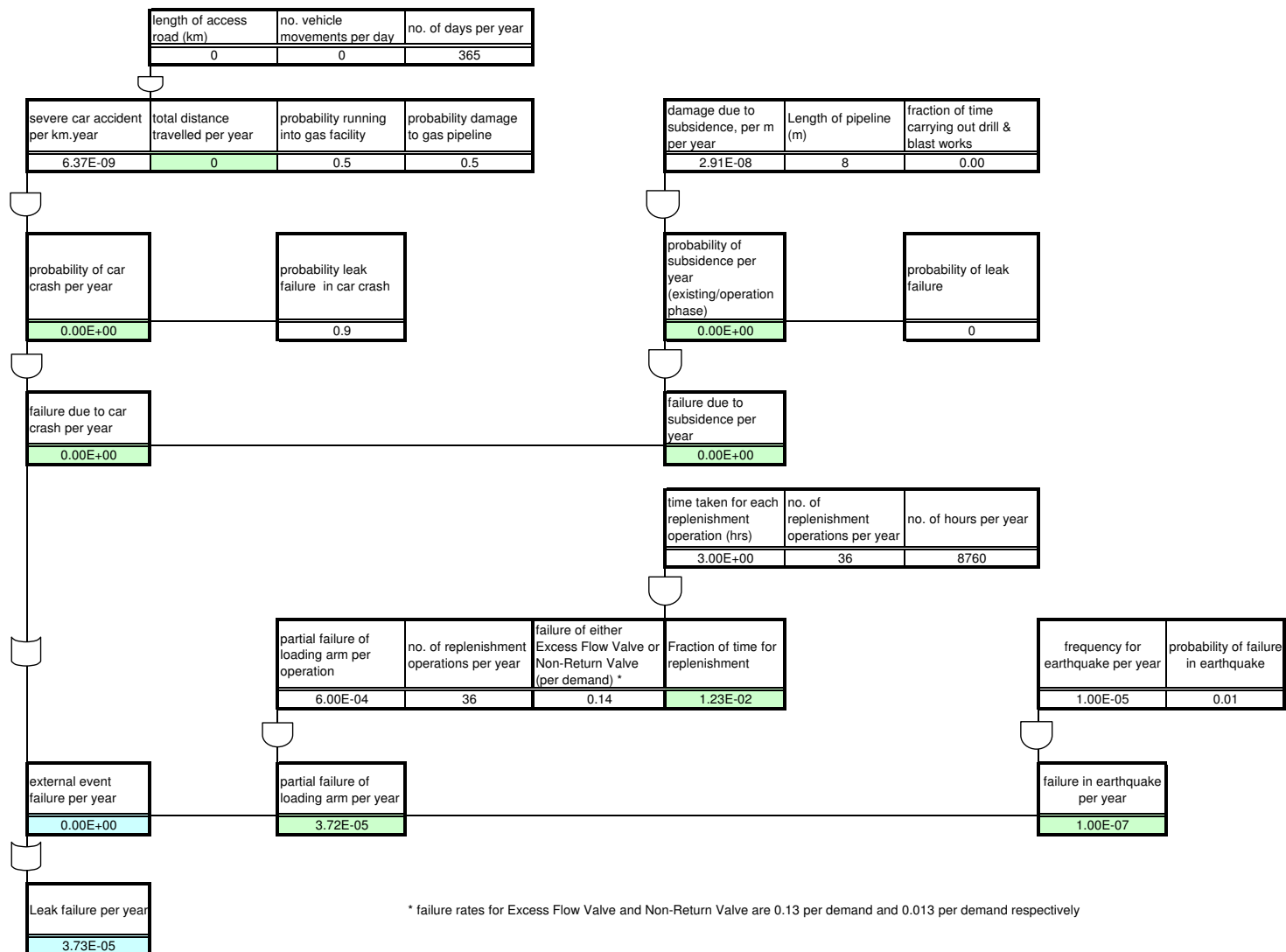
Partial Failure at Process Area



AND gate

OR gate

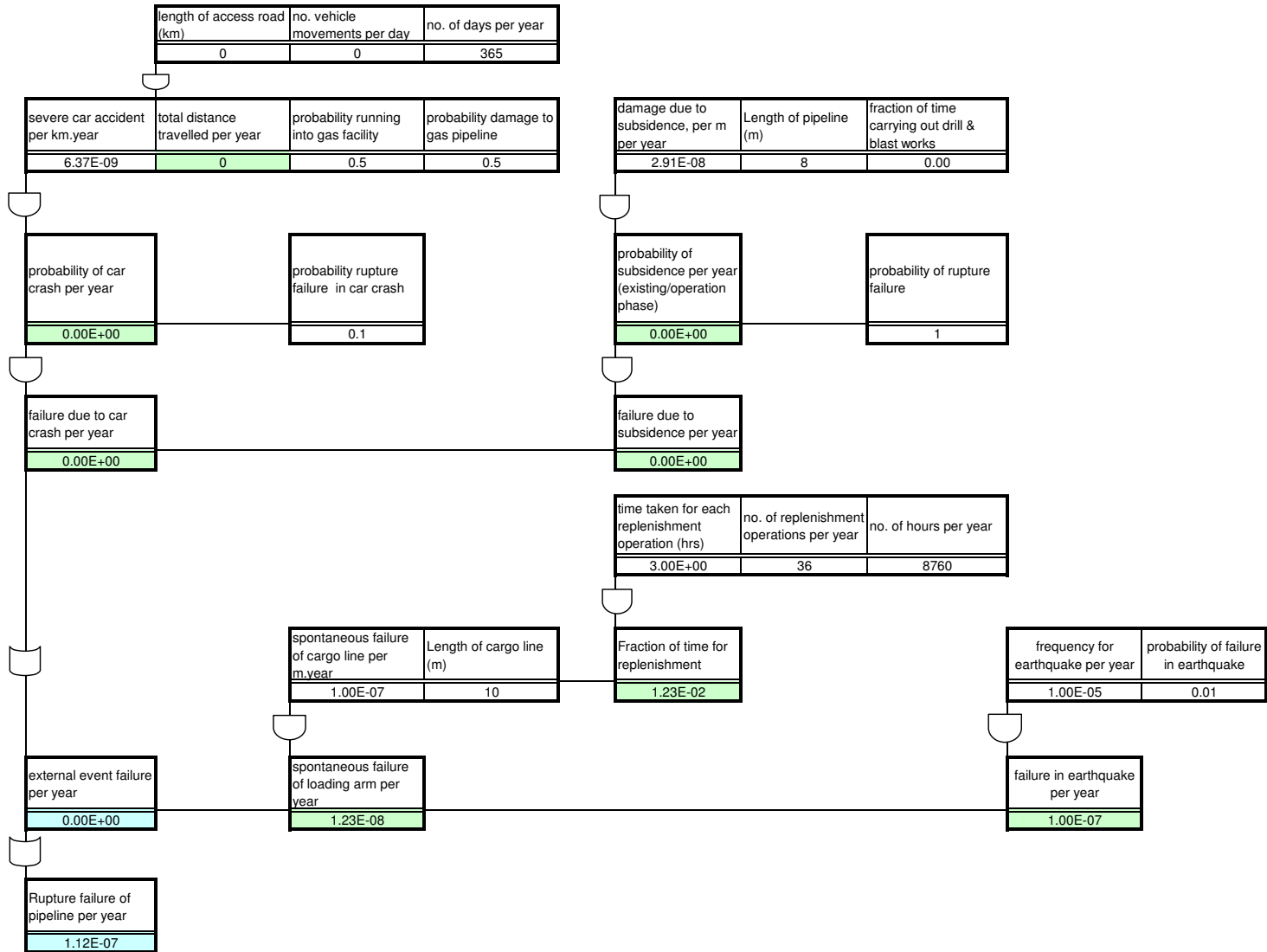
Rupture Failure for Naphtha Loading Arm



AND gate

OR gate

Leak Failure for Naphtha Loading Arm

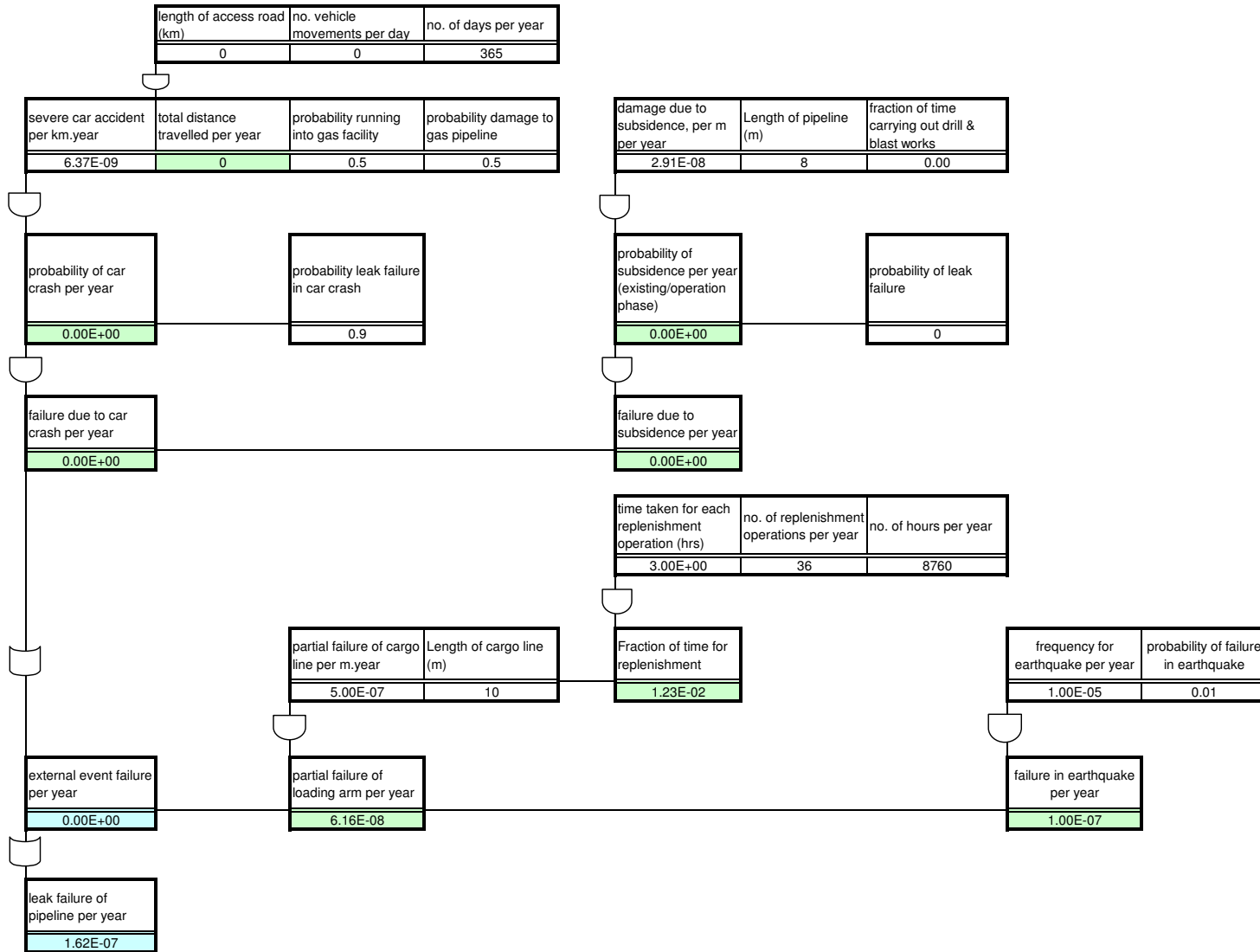


AND gate



OR gate

Rupture Failure for Naphtha Cargo Line



AND gate

OR gate

Leak Failure for Naphtha Cargo Line