

The values of an accident trigger probability, event chain probability, and evacuation trigger probability are shown in Table S1, Table S2, and Table S3.

**Table S1.** The proportion of accident frequency of different trigger factors.

Variable $I_i$	Description	Probability value
$I_1$	Probability of car body fire	0.0196
$I_2$	Probability of valve failure	0.0448
$I_3$	Probability of tank rupture	0.0399
$I_4$	Probability of brake failure	0.0173
$I_5$	Probability of tire burst	0.0429
$I_6$	Probability of rollover	0.3002
$I_7$	Probability of scraped	0.0267
$I_8$	Probability of impact	0.1535
$I_9$	Probability of rear-end collision	0.2528

**Table S2.** Probability of different event chains caused by different trigger factors in road transportation accidents of hazardous chemicals.

Variable $H_{ij}$	Description	Probability value
$H_{11}$	Probability of leakage caused by vehicle body fire	0.0000
$H_{12}$	Probability of leakage-explosion caused by vehicle body fire	0.0000
$H_{13}$	Probability of leakage-fire caused by vehicle body fire	0.0577
$H_{14}$	Probability of leakage-fire-explosion caused by vehicle body fire	0.0000
$H_{15}$	Probability of fire caused by vehicle body fire	0.5962
$H_{16}$	Probability of fire-explosion caused by vehicle body fire	0.0962
$H_{17}$	Probability of fire-leakage caused by vehicle body fire	0.0769
$H_{18}$	Probability of explosion caused by vehicle body fire	0.0192
$H_{19}$	Probability of explosion-fire caused by vehicle body fire	0.0192
$H_{21}$	Probability of leakage caused by valve failure	0.9664
$H_{22}$	Probability of leakage-explosion caused by valve failure	0.0000
$H_{23}$	Probability of leakage-fire caused by valve failure	0.0252
$H_{24}$	Probability of leakage-fire-explosion caused by valve failure	0.0000
$H_{25}$	Probability of fire caused by valve failure	0.0000
$H_{26}$	Probability of fire-explosion caused by valve failure	0.0000
$H_{27}$	Probability of fire-leakage caused by valve failure	0.0000
$H_{28}$	Probability of explosion caused by valve failure	0.0084
$H_{29}$	Probability of explosion-fire caused by valve failure	0.0000
$H_{31}$	Probability of leakage caused by tank rupture	0.9528
$H_{32}$	Probability of leakage-explosion caused by tank rupture	0.0094
$H_{33}$	Probability of leakage-fire caused by tank rupture	0.0377
$H_{34}$	Probability of leakage-fire-explosion caused by tank rupture	0.0000
$H_{35}$	Probability of fire caused by valve failure	0.0000
$H_{36}$	Probability of fire-explosion caused by tank rupture	0.0000
$H_{37}$	Probability of fire-leakage caused by tank rupture	0.0000
$H_{38}$	Probability of explosion caused by tank rupture	0.0000
$H_{39}$	Probability of explosion-fire caused by tank rupture	0.0000
$H_{41}$	Probability of leakage caused by brake failure	0.8913
$H_{42}$	Probability of leakage-explosion caused by brake failure	0.0000
$H_{43}$	Probability of leakage-fire caused by brake failure	0.0000
$H_{44}$	Probability of leakage-fire-explosion caused by brake failure	0.0217
$H_{45}$	Probability of fire caused by brake failure	0.0435
$H_{46}$	Probability of fire-explosion caused by brake failure	0.0435
$H_{47}$	Probability of fire-leakage caused by brake failure	0.0000
$H_{48}$	Probability of explosion caused by brake failure	0.0000
$H_{49}$	Probability of explosion-fire caused by brake failure	0.0000

$H_{51}$	Probability of leakage caused by tire burst	0.4336
$H_{52}$	Probability of leakage-explosion caused by tire burst	0.0000
$H_{53}$	Probability of leakage-fire caused by tire burst	0.0354
$H_{54}$	Probability of leakage-fire-explosion caused by tire burst	0.0354
$H_{55}$	Probability of fire caused by tire burst	0.3097
$H_{56}$	Probability of fire-explosion caused by tire burst	0.0354
$H_{57}$	Probability of fire-leakage caused by tire burst	0.0708
$H_{58}$	Probability of explosion caused by tire burst	0.0000
$H_{59}$	Probability of explosion-fire caused by tire burst	0.0000
$H_{61}$	Probability of leakage caused by rollover	0.9035
$H_{62}$	Probability of leakage-explosion caused by rollover	0.0025
$H_{63}$	Probability of leakage-fire caused by rollover	0.0401
$H_{64}$	Probability of leakage-fire-explosion caused by rollover	0.0100
$H_{65}$	Probability of fire caused by rollover	0.0125
$H_{66}$	Probability of fire-explosion caused by rollover	0.0013
$H_{67}$	Probability of fire-leakage caused by rollover	0.0000
$H_{68}$	Probability of explosion caused by rollover	0.0013
$H_{69}$	Probability of explosion-fire caused by rollover	0.0013
$H_{71}$	Probability of leakage caused by scraped	0.9155
$H_{72}$	Probability of leakage-explosion caused by scraped	0.0000
$H_{73}$	Probability of leakage-fire caused by scraped	0.0282
$H_{74}$	Probability of leakage-fire-explosion caused by scraped	0.0141
$H_{75}$	Probability of fire caused by scraped	0.0141
$H_{76}$	Probability of fire-explosion caused by scraped	0.0000
$H_{77}$	Probability of fire-leakage caused by scraped	0.0000
$H_{78}$	Probability of explosion caused by scraped	0.0000
$H_{79}$	Probability of explosion-fire caused by scraped	0.0000
$H_{81}$	Probability of leakage caused by impact	0.8554
$H_{82}$	Probability of leakage-explosion caused by impact	0.0000
$H_{83}$	Probability of leakage-fire caused by impact	0.0515
$H_{84}$	Probability of leakage-fire-explosion caused by impact	0.0147
$H_{85}$	Probability of fire caused by impact	0.0123
$H_{86}$	Probability of fire-explosion caused by impact	0.0147
$H_{87}$	Probability of fire-leakage caused by impact	0.0000
$H_{88}$	Probability of explosion caused by impact	0.0000
$H_{89}$	Probability of explosion-fire caused by impact	0.0074
$H_{91}$	Probability of leakage caused by rear-end collision	0.8586
$H_{92}$	Probability of leakage-explosion caused by rear-end collision	0.0015
$H_{93}$	Probability of leakage-fire caused by rear-end collision	0.0521
$H_{94}$	Probability of leakage-fire-explosion caused by rear-end collision	0.0193
$H_{95}$	Probability of fire caused by rear-end collision	0.0238
$H_{96}$	Probability of fire-explosion caused by rear-end collision	0.0104
$H_{97}$	Probability of fire-leakage caused by rear-end collision	0.0015
$H_{98}$	Probability of explosion caused by rear-end collision	0.0030
$H_{99}$	Probability of explosion-fire caused by rear-end collision	0.0045

**Table S3.** Different trigger factors in evacuation events lead to different event chain probabilities.

Variable $E_{ij}$	Description	Probability value
$E_{11}$	Evacuation probability of leakage caused by vehicle body fire	0.0000
$E_{12}$	Evacuation probability of leakage-explosion caused by vehicle body fire	0.0000
$E_{13}$	Evacuation probability of leakage-fire caused by vehicle body fire	0.0000

$E_{14}$	Evacuation probability of leakage-fire-explosion caused by vehicle body fire	0.0000
$E_{15}$	Evacuation probability of fire caused by vehicle body fire	0.0135
$E_{16}$	Evacuation probability of fire-explosion caused by vehicle body fire	0.0000
$E_{17}$	Evacuation probability of fire-leakage caused by vehicle body fire	0.0000
$E_{18}$	Evacuation probability of explosion caused by vehicle body fire	0.0068
$E_{19}$	Evacuation probability of explosion-fire caused by vehicle body fire	0.0000
$E_{21}$	Evacuation probability of leakage caused by valve failure	0.0338
$E_{22}$	Evacuation probability of leakage-explosion caused by valve failure	0.0000
$E_{23}$	Evacuation probability of leakage-fire caused by valve failure	0.0000
$E_{24}$	Evacuation probability of leakage-fire-explosion caused by valve failure	0.0000
$E_{25}$	Evacuation probability of fire caused by valve failure	0.0000
$E_{26}$	Evacuation probability of fire-explosion caused by valve failure	0.0000
$E_{27}$	Evacuation probability of fire-leakage caused by valve failure	0.0000
$E_{28}$	Evacuation probability of explosion caused by valve failure	0.0000
$E_{29}$	Evacuation probability of explosion-fire caused by valve failure	0.0000
$E_{31}$	Evacuation probability of leakage caused by tank rupture	0.0541
$E_{32}$	Evacuation probability of leakage-explosion caused by tank rupture	0.0000
$E_{33}$	Evacuation probability of leakage-fire caused by tank rupture	0.0000
$E_{34}$	Evacuation probability of leakage-fire-explosion caused by tank rupture	0.0000
$E_{35}$	Evacuation probability of fire caused by valve failure	0.0000
$E_{36}$	Evacuation probability of fire-explosion caused by tank rupture	0.0000
$E_{37}$	Evacuation probability of fire-leakage caused by tank rupture	0.0000
$E_{38}$	Evacuation probability of explosion caused by tank rupture	0.0000
$E_{39}$	Evacuation probability of explosion-fire caused by tank rupture	0.0000
$E_{41}$	Evacuation probability of leakage caused by brake failure	0.0203
$E_{42}$	Evacuation probability of leakage-explosion caused by brake failure	0.0000
$E_{43}$	Evacuation probability of leakage-fire caused by brake failure	0.0000
$E_{44}$	Evacuation probability of leakage-fire-explosion caused by brake failure	0.0000
$E_{45}$	Evacuation probability of fire caused by brake failure	0.0000
$E_{46}$	Evacuation probability of fire-explosion caused by brake failure	0.0000
$E_{47}$	Evacuation probability of fire-leakage caused by brake failure	0.0000
$E_{48}$	Evacuation probability of explosion caused by brake failure	0.0000
$E_{49}$	Evacuation probability of explosion-fire caused by brake failure	0.0000
$E_{51}$	Evacuation probability of leakage caused by tire burst	0.0203
$E_{52}$	Evacuation probability of leakage-explosion caused by tire burst	0.0000
$E_{53}$	Evacuation probability of leakage-fire caused by tire burst	0.0000
$E_{54}$	Evacuation probability of leakage-fire-explosion caused by tire burst	0.0000
$E_{55}$	Evacuation probability of fire caused by tire burst	0.0000
$E_{56}$	Evacuation probability of fire-explosion caused by tire burst	0.0000
$E_{57}$	Evacuation probability of fire-leakage caused by tire burst	0.0068
$E_{58}$	Evacuation probability of explosion caused by tire burst	0.0000
$E_{59}$	Evacuation probability of explosion-fire caused by tire burst	0.0000
$E_{61}$	Evacuation probability of leakage caused by rollover	0.3446
$E_{62}$	Evacuation probability of leakage-explosion caused by rollover	0.0000
$E_{63}$	Evacuation probability of leakage-fire caused by rollover	0.0068

$E_{64}$	Evacuation probability of leakage-fire-explosion caused by rollover	0.0068
$E_{65}$	Evacuation probability of fire caused by rollover	0.0000
$E_{66}$	Evacuation probability of fire-explosion caused by rollover	0.0000
$E_{67}$	Evacuation probability of fire-leakage caused by rollover	0.0000
$E_{68}$	Evacuation probability of explosion caused by rollover	0.0000
$E_{69}$	Evacuation probability of explosion-fire caused by rollover	0.0000
$E_{71}$	Evacuation probability of leakage caused by scraped	0.0338
$E_{72}$	Evacuation probability of leakage-explosion caused by scraped	0.0000
$E_{73}$	Evacuation probability of leakage-fire caused by scraped	0.0000
$E_{74}$	Evacuation probability of leakage-fire-explosion caused by scraped	0.0000
$E_{75}$	Evacuation probability of fire caused by scraped	0.0000
$E_{76}$	Evacuation probability of fire-explosion caused by scraped	0.0000
$E_{77}$	Evacuation probability of fire-leakage caused by scraped	0.0000
$E_{78}$	Evacuation probability of explosion caused by scraped	0.0000
$E_{79}$	Evacuation probability of explosion-fire caused by scraped	0.0000
$E_{81}$	Evacuation probability of leakage caused by impact	0.1014
$E_{82}$	Evacuation probability of leakage-explosion caused by impact	0.0000
$E_{83}$	Evacuation probability of leakage-fire caused by impact	0.0135
$E_{84}$	Evacuation probability of leakage-fire-explosion caused by impact	0.0000
$E_{85}$	Evacuation probability of fire caused by impact	0.0000
$E_{86}$	Evacuation probability of fire-explosion caused by impact	0.0000
$E_{87}$	Evacuation probability of fire-leakage caused by impact	0.0000
$E_{88}$	Evacuation probability of explosion caused by impact	0.0000
$E_{89}$	Evacuation probability of explosion-fire caused by impact	0.0068
$E_{91}$	Evacuation probability of leakage caused by rear-end collision	0.1351
$E_{92}$	Evacuation probability of leakage-explosion caused by rear-end collision	0.0000
$E_{93}$	Evacuation probability of leakage-fire caused by rear-end collision	0.0068
$E_{94}$	Evacuation probability of leakage-fire-explosion caused by rear-end collision	0.0000
$E_{95}$	Evacuation probability of fire caused by rear-end collision	0.0068
$E_{96}$	Evacuation probability of fire-explosion caused by rear-end collision	0.0000
$E_{97}$	Evacuation probability of fire-leakage caused by rear-end collision	0.0000
$E_{98}$	Evacuation probability of explosion caused by rear-end collision	0.0000
$E_{99}$	Evacuation probability of explosion-fire caused by rear-end collision	0.0000