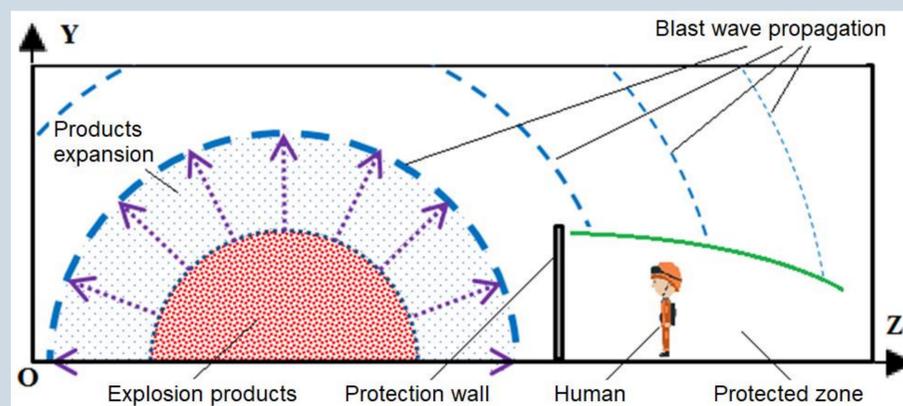
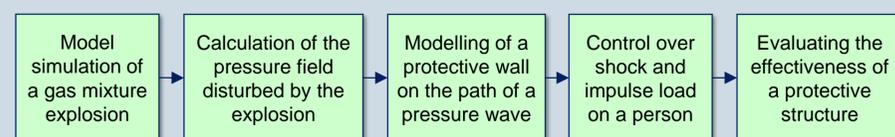


Using explosion modeling and probabilistic methods of assessing the shock-impulse impact of the pressure wave on humans, safety experts can predict the minimal height of the wall that secures the given injury level at the point of human location.



Accident scene: explosion products expand and generate shock pressure waves, which harmfully affect the exposed person behind the protection wall.



Hydrogen explosion consequences assessment.

Probit-analysis method

The conditional probability of human injury caused by shock-impulse impact of explosion pressure wave

$$P = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\text{Pr}} e^{-\frac{1}{2}(t-5)^2} dt,$$

where Pr is a probit-function and t is an integral degree of impact.

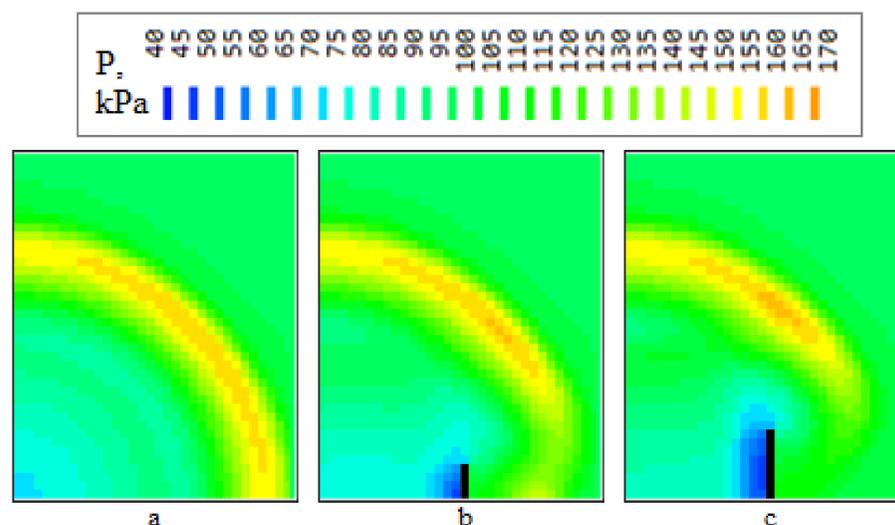
Human lethal damage probit-function:

$$\text{Pr}_1 = 5 - 0,26 \ln \left[(17500 / \Delta P_+)^{8,4} + (290 / I_+)^{9,3} \right]$$

Human eardrum rupture damage probit-function:

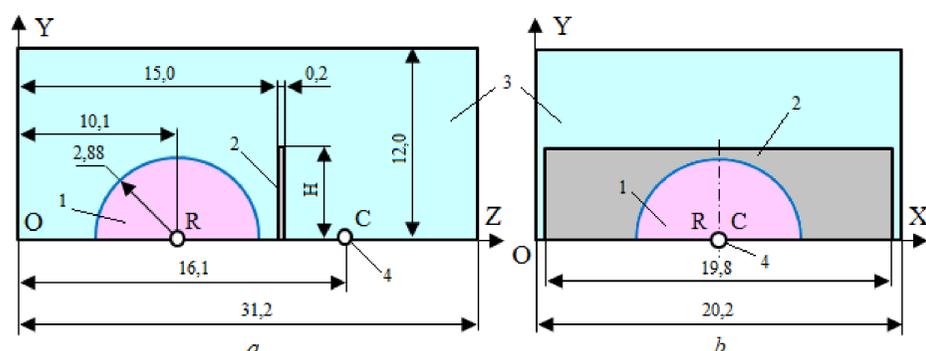
$$\text{Pr}_2 = -15,6 + 1,93 \ln \Delta P_+$$

Results



Static pressure fields 0,011046 seconds after the accident explosion starts (YOZ): a, b, and c – tests V0, V6, and V12 for different protection wall height

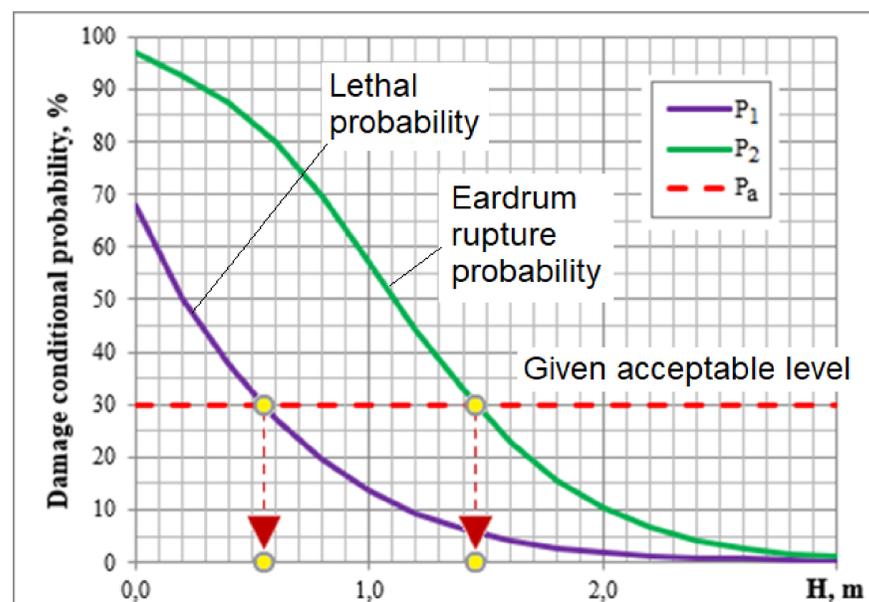
Computation experiments initial data



Map of objects: a – plane YOZ, b – front view YOX.

Parameter	Main options (explosion power)				
Wall height option identifier	V0	V1	V2	...	V15
Height of protective wall, m	0,00	0,20	0,40	...	3,00

Main calculation experiment parameters options.



Determining the safe height of a protective wall.