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# Colliding surface instability for a high velocity impact

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Physical processes accompanying high velocity impact phenomena with relative velocities 1-1000 km/s attract particular attention of mechanics and physicists over the past decades [1]. This is due to the wide prevalence of these effects in present-day technology and fundamental science. For example, they occur in inertial confinement fusion demonstration experiments with multi-layer targets (breakeven), in the development of spacecraft and vehicle meteor protection, in explosive welding and strengthening, in studying the matter properties in physical experiments with superhigh pressure values of order 0.1-1000Gbar and so on.

Sometimes the interaction surface turns out to be unstable and the characteristic recurring disturbances of a conic [2] or a similar shape form on it.

In this paper problems of instability development on colliding surfaces for a high velocity impact are studied by numerical simulation method using mass, impulse and energy conservation laws in continuum.

Using the numerical computional results the new mechanism of the instability development from the initial shape disturbances on interacting plate's surfaces is suggested, in which fundamental aspects are:

1.Mass flows deflection behind a curved shock wave front;

2.The interaction of the secondary compressed and shock waves with the primary shock waves.

The quantitative dependence of specific surface mixed matter mass of colliding plates on the initial radius of axially symmetric given shape disturbance is obtained. The specific surface mixed mass maximal value is displaced with time from the short wave part of the spectrum to the long wave one. The self-similar behavior of the specific surface mixed mass dependence on the dimensionless magnitude equal to the ratio of the plate's thickness to the product of the relative impact velocity multiplied by the process time from the moment of the plates contact to the rarefaction waves arrival at interface of two materials is detected [3-5].

## References

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