

Fluid Dynamics in Well Control

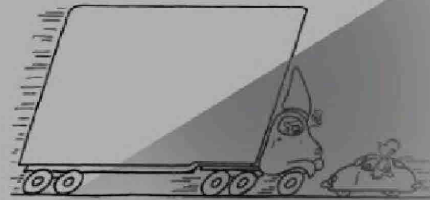


Figure 5.12

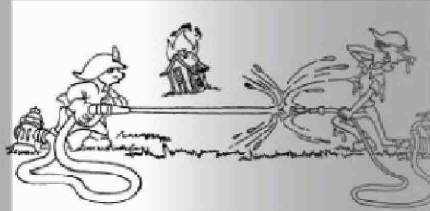


Figure 5.13

in doubt. The most fundamental principle of the car is in greater doubt. It is that the momentum of the car will be reversed. Conceptually, consider the men in Figure 5.13. Their attention to each other is destined for a bath.

The dynamics of a blowout are very much the same as those illustrated in Figure 5.13. The fluid flowing from the blowout exhibits a definable quantity of momentum. Therefore, if the kill fluid is introduced at a greater momentum, the flow from the blowout is reversed when the

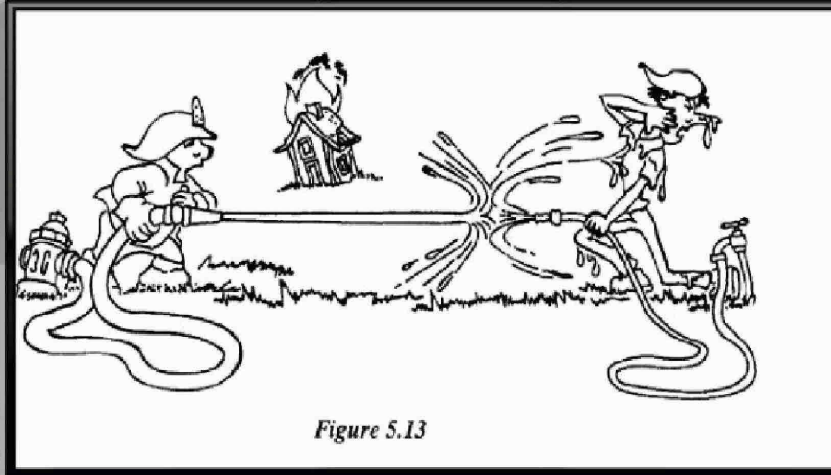


Figure 5.13

Blowout and Well Control Handbook

The governing physical principles are not significantly different from those governing the collision of two trains, two cars, or two men. The mass with the greatest momentum will win the encounter.

Newton's Second Law states that the net force acting on a given object is proportional to the time rate of change of linear momentum of that object. In other words, the net external force acting on the fluid within a control volume equals the time rate of change of momentum of the fluid in the control volume plus the net rate of momentum transfer across the surfaces of the control volume.

Consider the following development with all units being basic:

$$\frac{mv}{Bc} \quad (5.14)$$

rate of flow:

$$\rho v A = \rho q \quad (5.15)$$

conservation of mass:

$$m = \rho_1 v_1 A_1 \quad (5.16)$$

$m = \text{Mass, lb}_m$

The dynamics of a blowout are very much the same as those illustrated in Figure 5.13. The fluid flowing from the blowout exhibits a definable quantity of momentum. Therefore, if the kill fluid is introduced at a greater momentum, the flow from the blowout is reversed when the

fluids collide. The governing physical principles are not significantly different from those governing the collision of two trains, two cars, or two men. The mass with the greatest momentum will win the encounter.