TYPES OF CAVITATION, CAUSING VIBRATION IN ENGINEERING AND WATER SUPPLY SYSTEMS

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Abstract. *At the moment, there are no clearly defined principles of cavitation types. We use an agreed-upon, widely used term in our literature. First of all, cavitation is divided into separate sections according to the reasons for its occurrence. Proceeding from this, cavitation can be divided into hydrodynamic and acoustic types. Movement of liquids and acoustics (impact of sounds) occupy a very important place in the adoption of engineering solutions. In the first case, the pressure drop passes through the critical point, changing the direction and shape of motion relative to the velocity vector. In the second case, the formation of cavitation is caused by the oscillating effects on the liquid, which can be imagined by an example of the work of hydroacoustic stations. The appearance and development of porosity in the liquid can be carried out by directing (blowing) gas to it.Therefore, natural cavitation and Artificial, a solid body that is formed under external influence, that is, interacting with a liquid; as well as artificial, cavitations that occur under the influence of gas, which are forcibly directed to certain points of the flow, are known.*

Keywords: *Vibration, resonance, transverse waves, disturbance waves, cavitation zone, initial section of pipe rotation, velocity axis, radius of curvature during rotation.*

ВИДЫ КАВИТАЦИИ, ВЫЗЫВАЮЩИЕ ВИБРАЦИЮ В ИНЖЕНЕРНЫХ СИСТЕМАХ И СИСТЕМАХ ВОДОСНАБЖЕНИЯ

Аннотация. *На данный момент не существует четко определенных принципов типов кавитации. Мы используем общепринятый, широко используемый термин в нашей литературе. Прежде всего, кавитация делится на отдельные разделы в соответствии с причинами ее возникновения. Исходя из этого, кавитацию можно разделить на гидродинамический и акустический типы. Движение жидкостей и акустика (воздействие звуков) занимают очень важное место при принятии инженерных решений. В первом случае перепад давления проходит через критическую точку, изменяя направление и форму движения относительно вектора скорости. Во втором случае образование кавитации вызвано колебательным воздействием на жидкость, которое можно представить на примере работы гидроакустических станций. Появление и развитие пористости в жидкости может быть осуществлено путем направления (продувки) в нее газа.Поэтому известны естественная кавитация и искусственная, твердое тело, которое образуется под внешним воздействием, то есть взаимодействует с жидкостью; а также искусственные, кавитации, возникающие под воздействием газа, которые принудительно направляются в определенные точки потока.*

Ключевые слова: *Вибрация, резонанс, поперечные волны, волны возмущения, зона кавитации, начальный участок вращения трубы, ось скорости, радиус кривизны при вращении.*

INTRODUCTION

The phenomenon of cavitation is also caused by a decrease in pressure and an increase in speed. The speed of movement of the body is decisive: the higher the speed, the faster the

dispersion and, accordingly, the more cavitation processes should be intensive. It is usually studied by separating the initial and advanced stages of cavitation. Within each phase, different forms of cavitation can be seen. In this way, at the initial stage, it is exposed to the formation of bubbles or plaques, as well as to the herniated uyurmal cavitation. The external signs of this stage are the formation of a large number of small bubbles and their movement in the reduced pressure zone and the rupture occurs when they rise to a high pressure environment (these phases occur either at the top or in the center of the whirlpool).

MATERIAL AND METHODS

In the developed cavitation, large layers (Caverna) are formed in the liquid, these layers are filled with a vapor-gas mixture, and the fact that the moving bodymga is stuck is noticeable. Caverns are either adjacent to the body (partial cavitation) or are directed downward in terms of flow from behind the body. The structure and motility of the cavern is associated with many factors: the speed and depth of movement of the body; its forms; the separation of the boundary layer in front of the stranded flow point; the presence, absence of blowing, and the stability and transparency of the Caverna stream in the wall of the starting area. In the tail part of the stream, there are cracks that are observed with an anti-aging compound, davriy which breaks down the Caverna wall and is separated from the vapor-gas mixture in a separate volume. In the tail part, the flow will be seriously inadequate, and its boundaries will be violated. Behind the Kaverna is observed a two-phase current.A similar situation is observed under certain conditions in blowing (ventilation).At the same time, in artificial cavitation, the completion of a completely different type of cavern is followed by the completion of two transverse slits with a false address.

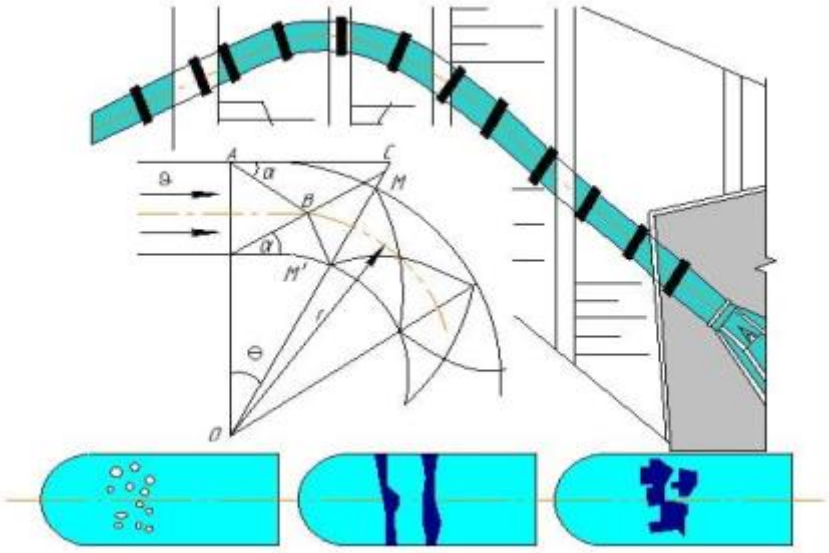

Fig 1.

Cross-section of high-pressure flow pipe turn wave propagation and in front of the rotating body in the pipe development of cavitation.

RESULTS

Moving cavitation. It is said that in relation to the type of cavitation, in which gaps or bubbles that do not stand out separately in the liquid are formed, moving with it, simultaneously clogging, shrinking, and then collapsing. Such moving non-standard bubbles can appear at low pressure points on the solid boundary and in the volume of the liquid, in the core of the moving

vortex, or in the region of viscous flow with a high degree of turbulence. The movement of these cavities under such cavitation means that they are more specific to other types of non-stationary cavities.

When visually observed with an unarmed eye, moving cavitation may appear to be a permanent cavitation zone. Moving cavities can be seen near a simplified surface at a minimum pressure point in the liquid or slightly lower flow. The cavities multiply in the zone of low pressure and begin to crack immediately, as soon as the saturated vapor enters the zone of high pressure. Cracking is often accompanied by a series of repetitions and contractions, which release the pressure pulsation.

Added cavitation. After the appearance of cavitation and the liquid is called cavitation, which is attached to the solid wall, that is, to the edge of the Uzan, separated from the wall of the pipe, or cavitation, which appears after the cavity. Unstable, or the added Caverna stagnant forms only the surface of the turbulent flow, boiling at the boundary of the quasi-stationary cavitation flow, in which case the quasi-stationary cavitation flow (in which case, in the remaining cases, a smooth, clear surface between the liquid surface and the Caverna appears.

Whirlpool cavitation. Swirling cavitation is noticeable in the center of the stream, forming zones in which the tension is greater. There will be no difference between cavitation in a non-flowing body with cavitation in the flow of non-flowing liquids. In both cases, the main parameters are speed and pressure, which play a role, and only one difference is that in the non-flowing stream, the turbulence is finally low.Cavitation phenomenon is mainly threeraydi in Long channels, turbulence in these channels increases to the cavitation zone.

Cavitation caused by vibration. Cavitation, which occurs in the body through vibration, which occurs in a calm liquid, is called a vibrating cavitation. By experiments, it is known that the separately obtained element of the liquid passes only once through the cavitation zone. But in the cavitation of the body through vibration, this condition is not observed, which in this case remains constant current. As a result of the forces acting on the caverns that arise in a calm state of flow, cracking occurs, high-frequency vibrations occur in the vibrating cavitation. The amplitude of these vibrations is greater, the pressure in the flow drops and cavitation appears.

Cavitation in the rotating body. -the picture shows the distribution of the transverse waves in the pipe turn of the high-pressure flow and the development of cavitation in the anterior part of the rotating body in the pipe, which explains the combination of the anterior (nasal) side of the oblique cylindrical body on the nasal side. The purulent cavitation is caused by a cylindrical and spherical surface on the part corresponding to the maximum discharge.

DISCUSSION

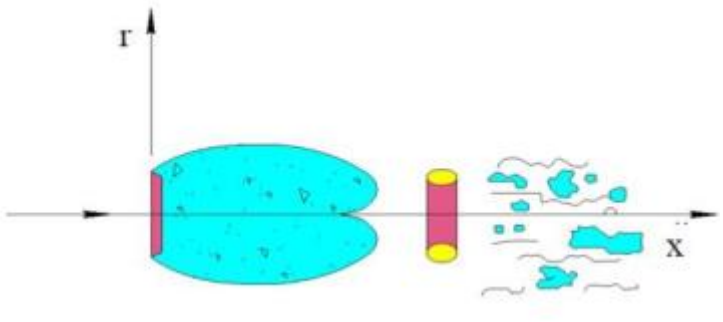

Fig 2.

Developed behind the rotating body the presence of cavitation current

Thin layer (coat)shaped slightly below the simon cavitation flow.Sometimes a single-belt cavitation with a thin membrane divides into a number of spots.

We can visually demonstrate the developed cavitation current behind the rotating body on the example of a cross-mounted disc strain into a stream (Fig 2).

CONCLUSION

There are types of cavitation phenomenon considered above, depending on these types, it is possible to assess the effects of cavitation formation development on the gidroinshoot.The phenomena formed as a result of cavitation can mainly cause vibrations in the water release sleeves of the godro-structures and lead to the deformation of the gidroinshoot. Under natural cavitation, an ellipticoid-shaped cavity is formed behind the disc. Starting from the thrust of the rotating stroy rolling direction in the middle part, change the direction of movementtiradi, interact with the walls of the cavern and begin to break the wall davriy. In the stream, large-sized tripled slats are observed, interruptions in the gaseous levels break down during the movement, and behind the Caverna appear two-phase foam traces. It turns out that the gas that appears on the liquid becomes a pulling-wheel hub, pulling out the gases.

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