Journal of Engineering and Applied Sciences 12 (15): 3976-3978, 2017
ISSN: 1816-949X

Submerged Sensor and Experimental Authentication of Separate Seal Structure

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Abstract: Enhancing the contemporary marine investigation framework, a separable seal structure of the submerged sensor is advanced in the study plans of the entire mechanical seal structure and also short strides of gathering are presented, trailed by a figuring check and programming recreation. The entire seal capacity is completed by the hydrostatic pressure seal with an O-ring and an annular elastic knock. The recurrence reaction bends have been drawn all through vibration test and yield signs are broke down to affirm the unwavering quality of the separable structure. Under the commence of ensuring the test prerequisites, this structure has focal points of both being separable and every inside component are anything but difficult to be supplanted contrasted and the current vulcanized seal ones.

Key words: Submerged sensor, seal structure, O-ring, hydrostatic pressure, yield signs, structure

INTRODUCTION

The submerged sensor has turned into a fundamental discovery gadget in marine projects and requests for submerged sensors are expanding always. Explanations behind this inclination are different, extending from the critical requirement for submerged investigation to marine economy advancement. Since, an impressive piece of sensors are utilized as a part of the water, incredible fixing property is a standout amongst the most noteworthy elements worth considering. Past examinations show that vulcanized seal can adequately maintain a strategic distance from water reaching the sensor's inside structure as vulcanized rubber layer the joint of the sensor and link straight forwardly shown by Liang *et al.* (2010). In any case, the rubber layer tends to split during the time spent lifting and bringing down submerged sensors. For instance, limited by research costs, a lot of trials are performed in a huge pressure water tank, rather than in the remote ocean (Kolukisa, 2007).

The vast pressure water tank can recreate a high-pressure condition in the water. Be that as it may, bay of the water tank is restricted which is hard to lift the sensor out of the tank. Furthermore, structures for example, spine plate inside the tank is probably going to confound the sensor (Daub *et al*., 2015). Any despicable operations may prompt the harm of the rubber layer and after that the full arrangement of sensor gadget (links and the submerged sensor) (Deng, 2006; Hu *et al*., 2005; Southwell, 1914; Stewart, 1906; Karthik, 2016). No doubt, consequently that further examinations are expected to keep water from nourishing the sensor and in addition extend the administration life of submerged sensors. Analysis of experimental and numerical simulation of magnetic pulses for joining of dissimilar materials with dissimilar geometry using electromagnetic welding process. The basic role of our examination is to reshape the fixing sealing structure of submerged sensors.

MATERIALS AND METHODS

Proposed system: In this area, we plot a separable structure of submerged sensors and also a concise get together procedure of it. We thought it important to accomplish the three capacities for a submerged sensor which are separable, seal and pressure bearing. Since, the pressure bearing capacity is viewed as an implicit capacity in this part we just commit to the separable character.

In the first place, the sensor body is settled inside the structure, associated with the pressure bearing body by methods for a base. The base is exceptionally outlined, with a stud toward one side to interface the base to the weight bearing frame. A notch on flip side of the base is intended to settle the sensor body. Just modest relative dislodging between the sensor body and the structure is permitted and just for this situation reaction bends measured are receivable. Hypothetically, we respect the association of sensor body and the entire structure as unbending association. The establishment manages the issue of sensor development brought about by vibration or different aggravations during testing.

Second, submerged sensor is separable from the link. As specified over, the rubber layer tends to break when experimenters lift or lower the sensor. The separable structure surrenders the normal rubber layer and could maintain a strategic distance from the entire test framework out of utilization in that links can be supplanted independently.

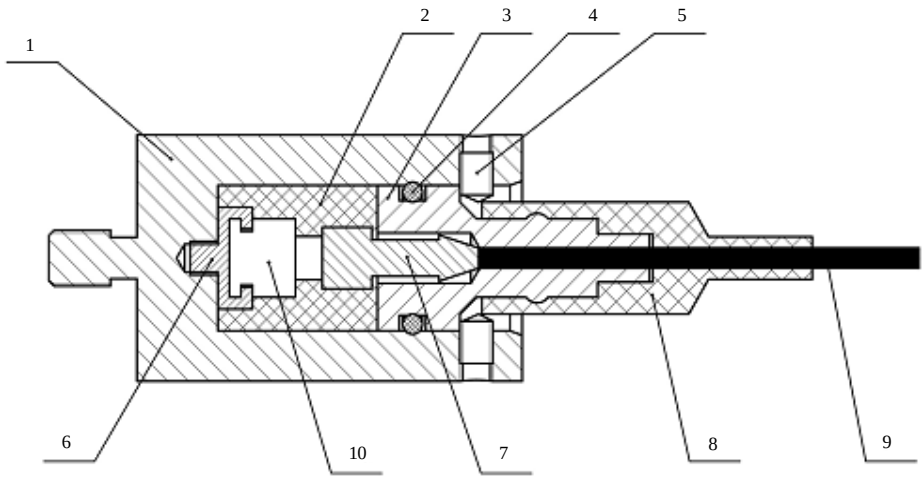

Fig. 1: Separable structure of submerged sensor; 1) Pressure-bearing hull; 2) Liner bushing; 3) Seal cover; 4) O-ring; 5) Bolt; 6) Base; 7) BNC connector; 8) Rubber sleeve; 9) Cable and 10) Sensor body

Last when testing parameters are changed and specialists need to change different sorts of submerged sensors, it will be helpful to substitute another one because of the separable structure. Along these lines utilize expenses and upkeep expenses are decreased viably contrasted and the current structure which need to change sensors and links synchronously.

RESULTS AND DISCUSSION

Figure 1 the separable structure comprises of 9 sections (aside from the sensor body). At the beginning of get together, introduce sensor body on the base, guarantee the removal of sensor body is reliable with the base however much as could be expected. Taking after this, apply screw stick on the base and screw the construct into the strung gap with respect to the pressure bearing frame utilizing an extraordinarily outlined sleeve. After this, rubber sleeve and seal cover go through the finish of the link in legitimate arrangement and connect elastic cover to rubber sleeve as indicated by the lump on the outside. Introduce O-ring into the furrow of the seal cover. At that point, one side of BNC connector is braced with the link while the opposite side associates with sensor body as string. Plug seal cover, O-ring and rubber sleeve into pressure bearing frame and after this two fasteners are screwed into the strung gaps which are on the pressure bearing structure. At long last screw the whole separable structure into the deliberate part.

Besides, a special screw fastener which can be seen on Fig. 1 is formulated on one side of pressure bearing frame to associate submerged sensor with the deliberate part. Two fasteners screwed into the weight bearing structure are longer than the thickness of the pressure body which can keep the close cover from falling.

CONCLUSION

For an underwater sensor, one of the most important property is seal. In the study, we apply hydrostatic pressure seal theory to the attachable structure. O-ring and annular rubber bump are designed to protect water from contacting the sensor body under high pressure. Large relative amplitude cans high frequency which means a resonance phenomenon. However, the resonance phenomenon could be easily eliminated by changing experimental conditions or connection mode between impedance head and the designed sensor.

REFERENCES

Daub, O., G. Grau, K. Hocker, A. Konik and W. Neuschwander et al., 2015. Seal for sealing a sealing gap and method for producing a seal of this type. Washington, DC., U.S. https://www.google.com/patents/US9182041.

Deng, A.M., 2006. Research on reliability technology of high-reliability and long-lifetime products. BSc Thesis, National University of Defense Technology, Changsha, China.

Hu, D., R. Wang, Q. Ren and J. Hong, 2005. Investigation of design parameters and failure criteria of O-ring seal structure. Proceedings of the 2005 ASME Turbo Expo on Power for Land, Sea and Air, June 6-9, 2005, International Gas Turbine Institute, Reno, Nevada, USA., ISBN:0-7918-4727-6, pp: 405-412.

Karthik, S., 2016. Remote operated underwater welding vehicle. Proceedings of the 21st Symposium on Offshore Emerging Offshore Technology and Deepwater Trends, February 16, 2016, Society of Naval Architects and Marine Engineers, Houston, Texas, ISBN:9781510826434, pp: 532-539.

Kolukisa, S., 2007. The effect of the welding temperature on the weldability in diffusion welding of martensitic (AISI 420) stainless steel with ductile (spheroidal graphite-nodular) cast iron. J. Mater. Process. Technol., 186: 33-36.

Liang, Q., D. Zhang, Q. Song and Y. Ge, 2010. A potential 4-D fingertip force sensor for an underwater robot manipulator. IEEE. J. Oceanic Eng., 35: 574-583.

Southwell, R.V., 1914. On the general theory of elastic stability. Philosoph. Trans. Royal Soc. London Ser. A. Containing Pap. Math. Phys. Charact., 213: 187-244.

Stewart, R.T., 1906. Collapsing pressures of bessemer steel lap-welded tubes, three to ten inches in diameter. Trans. ASME., 27: 730-820.