International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.01, April 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

A REVIEW ON DESIGN OFAMPHIBIAN ROBOT

Rahul Prasad[1],Veersen Paswan[2], Suraj Kumar Yadav[3],
Pawan Kumar Pal[4],Ms. Rangoli Shrivastava[5]

1, 2, 3,4(E&C Deptt., BIT, GIDA, Gorakhpur, India)
5(Asst. Prof., E&C Deptt., BIT, GIDA, Gorakhpur, India)

ABSTRACT

In this paper, we present our project amphibian robot.. Ultimately it has resulted in the invention of the robot. In today's life, technology concern with robots plays and important role in many field. An Amphibious vehicle is a means of transport, viable on land as well as on water even under water. It is simply may also called as Amphibian. Amphibious vehicle is a concept of vehicle having versatile usage. It is a wireless controlling robot through wireless remote. It is a robot which uses the principle of buoyancy to vary its depth in water. This project will be upgradeable with the variety of applications. Long term goal of research is to develop outdoor plateform which is suitable as well as security and surveillance and various seperate mission. The robot complete complex task in several area using wireless controlling.It uses microcontroller (atmega8)or Bluetooth module (HC-05) for controlling the robot.This will greatly simplify the autonomous control problem and give the vechicle a versatility that no amphibious robot has yet enjoyed.This design is very useful for the purpose of defence as it is user friendly and automated.

Keywords-Amphibian robot, Wireless remote, Automation, used for defence purpose, Future and benefits.

I.INTRODUCTION

A robot is capable of replicating or resembling the human actions with the collection of components like sensors, power supplies and controls. The essential characteristics of the robot are Sensing, Movement, Energy, and Intelligence. These characteristics have enabled them to replace the human beings in many critical situations. The high accuracy and precision in their work make them more efficient than the human beings.

Besides that, the design of the vehicle should have an aura of attraction to people who see every details of design in terms of creativity and aesthetical value. Therefore, in this paper designs process are documented according to stage which the design is start from scratch. Selection of materials for the manufacture of basic materials is an important vehicle for ensuring that the vehicle is able to float on the water . Among the criteria required material for manufacture of the vehicle is that it must be durable, has good properties of waterproof, easy to set up and easy to do the repairs in the event of damage and maintenance work.Long term visions include the use of robots to scout and map potential approach lanes for amphibious naval operations. Control, navigation, communication, obstacle avoidance, and sensor payloads remain critical issues to be resolved for successful operation. Recent work in this area has focused the construction of robots based on legged and/or

crawling elements to address these issues.Surveillance is a process of continuously monitoring a area/field to gather sufficient information about the type and nature of the surrounding environment, for this purpose on board camera of wide angle field with night mode operability is mounted. In a particular sensitive area where security is main priority like nuclear areas, ship building yards etc. Certain areas which are based on or near water bodies makes them vulnerable against any form of aggression aimed at them through water. It is very easy to have access to these sites through water because the security measures are a bit relaxed on water as compared to land.

II.LITERATURE REVIEW REPORT

There have been a lot of developments and innovations in amphibian robots with different locomotive mechanisms. They can either move using wheels or using motor. Robots usually have to use mechanical concepts and buoyancy principle to float.

Principle

BUOYANCY PRINCIPLE:Wherever possible the heavy equipments were kept at lower cavity of the Hull to achieve a considerable gap between the centre of gravity (CG) and centre of buoyancy (CB). More the separation the better is the stability and as a result the sway tends to stabilize faster. The restoring couple for roll stabilization generated due to such positing of CG and CB. With dimensional parameters, the roll restoring couple-arm was measured to be 50 mm/30° tilt. The overall system was designed slightly over-buoyant. However, buoyancy packs and dead weights were provided to fine-tune overall buoyancy. The system can be deployed neutrally-buoyant, over-buoyant or under-buoyant depending upon the mission requirement. This enables to adjust the weight of the system to crawl on the mine bed of fully flooded mine galleries/tunnels or float on the surface of water in partially flooded tunnels

Methodology

An Amphibious vehicle is a means of transport, viable on land as well as on water even under water. Replicating its properties it has large number of motors, which adds to the robot flexibility and range of surveillance. Buoyant force: When an object displaces water, the water surrounding it has the tendency to try to fill in the space the object now occupies.The water pushes against the object, exerting pressure and force on it. Positive, Neutral, and Negative Buoyancy: A submerged object like a ROV will float or sink depending upon the net effect of the weight of the object and the buoyant force generated by the object.

Instead, to prevent the cancelling of the thrust force, robots take their limbs out of water during the portion of swimming stroke when the limbs are not pushing the water back.

Project Block Diagram

International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.01, April 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

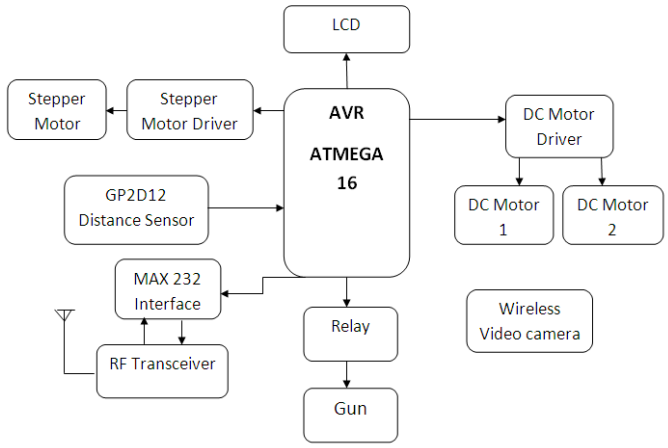

Figure1: Functional Block Diagram of amphibian robot

Observation

The main difficulty associated with robot is while using it like a submarine. It require a large number of motors and a 3D model analysis of amphibian robot.Underwater locomotion of robot is difficult to control and sealing of it require acrylic body which is difficult.

Project Diagram

Figure-1: Robot Model

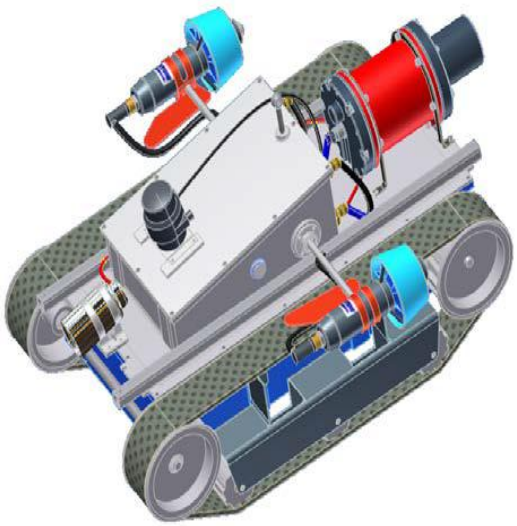

Figure-2:Few models of Amphibian robot

III.APPLICATIONS

a. Military

b. Space finder

c. Medical

d. Transpotation

e. Bomb Diffusion Squad

f. Surveillance

IV.CONCLUSIONS AND FUTURE SCOPE

The project on which the work is being carried out will provide helping hand in certain complicated task, which are impossible to be performed by human. The monitoring of the work which is performed is done easily with the help of camera. Human effort is reduced up to certain limit. Amphibian robots are used in different kind of applications like military, surveillance, security service, riot control, hostage situation, police, law enforcement,

border patrol, working in chemical environment is area with incompatible circumstances etc. It is used to augment the soldier's capability in the field of military operations. A Dead Reckoning (DR) capability will be added to the system in the near future. Current position information is the sole result of the ability to receive accurate GSP data. However, GPS cannot and should not be relied upon as the only source for position. The concept of operations for the platform includes some time at, near or under the water and would preclude GPS reception.

REFERENCE

[1] Ralston J C and Hainsworth D W 1998 *The Numbat: A Remotely Controlled Mine Emergency Response Vehicle, Field and Service Robotics* (London: Springer) pp 53-59

[2] Thrun S, Hähnel D, Ferguson D, Montemerlo M, Triebel R, Burgard W, Baker C, Omohundro Z, Thayer S and Whittaker W 2003 *A system for volumetric robotic mapping of abandoned mines, Proc. IEEE Int. Conf. Robot. Autom.* (Taiwan: Taipei) pp 4270–4275

[3] Baker C, Morris A, Ferguson D, Thayer S, Whittaker S, Omohundro Z, Reverte C, Whittaker W, Hähnel D and Thrun S *A Campaign in Autonomous Mine Mapping* (Pittsburgh: Carnegie Mellon University)

[4] Ferguson D, Morris A, Hähnel D, Baker C, Omohundro Z, Reverte C, Thayer S, Whittaker W, Burgard W and Thrun S *An Autonomous Robotic System for Mapping Abandoned Mines* (Pittsburgh: Carnegie Mellon University)

[5] Morris A, Silver D, Ferguson D, and Thayer S *Towards Topological Exploration of Abandoned Mines* (Pittsburgh: Carnegie Mellon University)

[6] Shaffer G and Stentz A 1992 *A Robotic System for Underground Coal Mining*, *IEEE International Conference on Robotics and Automation* Vol 1, pp 633-638

[7] Ibrahim M Y and Barfoot C 1997 *Robotization of Coal Harvesting in Open Cut Lignite Mines*, *Industrial Robot*, vol 24, No 5, pp 376-381

[8] Forster S and Schraft R D 1990 *First steps towards an autonomous mining robot for coal extraction*, *IEEE International Workshop on Intelligent Robots and Systems '90, Towards a New Frontier of Applications*, Vol 2, (New York) pp 487-492

[9] Ray D N, Dalui R, Maity A and Majumder S 2009 *Subterranean Robot: A Challenge for the Indian Coal Mines, The Online Journal on Electronics and Electrical Engineering (OJEEE)*, Vol 2, No 2, pp 218-222

[10] Eastern Coalfielda Limited, *http://easterncoal.gov.in/ index.html*, Satgram Projects

[11] Indian Coal Mines Regulations, *The Coal Mines Regulations-1957 (Section 57 of the Mines Act, 1952)* Govt. of India

[12] Duff E S, Roberts J M and Corke P I 2002 *Automation of an Underground Mining Vehicle using Reactive Navigation and Opportunistic Localization*, (Auckland: Australasian Conference on Robotics and Automation)

[13] Singh T N and Singh B 1985 *Model simulation study of coal mining under river beds in India*, Vol 4(3), pp 1-10 (Madrid: International Journal of Mine Water)

[14] Vutukuri V S and Singh R N 1995 *Mine Inundation- Case Histories, Mine Water and the Environment*, Vol 14, Annual Issue, Paper 9, pp 107-130

[15] Atanu Maity, Somajyoti Majumder, Dip Narayan Ray; *Amphibian Subterranean Robot for Mine Exploration*, In proc. of 2013 International Conference on Robotics, Biomimetics, Intelligent Computational Systems (ROBIONETICS), Yogyakarta, Indonesia, November 25-27, 2013, pp. 242-246 IEEE/ASME International Conference on Advanced Intelligent Mechatronics, vol. 2, Como, Italy, July 2001, pp. 1291–1296.