Aim of the project:

To design a robot that could traverse underwater and do the following tasks:

1. Surveillance
2. Welding

Approach:

The project was divided into 4 sub parts:

1. Design of outer body of the robot.
2. Sealing of the robot.
3. Design of the internal structure for specific tasks.
4. Locomotion of the robot.

The approach was such that we have to design an optimum outer body so that it should have minimum possible area. Since the robot was meant to perform welding, so it needed a dry surface to perform it effectively. So we have to simultaneously think upon the mechanism to be used to seal the body of the robot so that the internal parts of the robot could be isolated from the outer water surface.

In order to seal the body from the surrounding water, we are using gaskets.

Flowchart of the operation:

The operation starts with the entrance of the robot into the tank(filled with with water) using a crane. There it starts its surveillance using a camera fitted at its base. Once it detects a crack in the surface, we seal that particular area within a chamber using a series of gaskets. Then the water inside the chamber is evacuated with the help of a pump. In order to confirm the leak tightness of the area, we are using a rubber fabric at the base. The air under the fabric will be sucked out using a vacuum pump. Once the air inside the rubber fabric is sucked out, the fabric will stick to the surface and thus provide a leak proof area.

Now the robot will be able to perform the required task. The gate (above the chamber) will now open so that the tools to be used in the operation can come out and perform the task.

the design of the outer chamber, gate and gasket has already been made after proper calculations. The design is made keeping into mind all the necessary considerations.

We are now moving ahead towards the next level of the project, i.e., the mechanisms involved in the completion of the task.

Basic ideas to be researched upon:

There will be a separate chamber inside the robot which would be isolated from the surrounding water. The gates of this chamber will open after evacuation of water from the outer chamber. Now there will be a robotic gripper inside the inner chamber which will be used to perform various jobs using various tools.

The tools to be used will be fixed in the inner chamber. The gripper will grip the tool and do the task and then place the tool back to its position.

Also a mechanism is to be used such that the gripper is able to reach any co-ordinates inside the chamber because the surface enclosed by the chamber is the space in which the task is to be performed.

This part of the project is already in progress and the design of the inner chamber including all the mechanisms will be ready by the next week.