

Applications of Underwater Projection

1. Underwater projection may be used to attract underwater creatures. The screen/panel may be used to display bait such as shrimps on an NPD-LCD projection film/panel in a lake or ocean at night. Use of "Automatic Fishing Machine" may allow fishing in dark with nets around the machine and regularly collect fishes. In these ways, farmers or environmental protectors can also catch and remove or otherwise control unwanted species by displaying their favor foods or prey to attract the species. This kind of "fish attractor" may concentrate fishes in lake and ocean and increase production. Projected images on an NPD-LCD film/panel, is viewable from both sides and thus can attract fish from all directions. The projected surfaces, such as NPD-LCD display, can also be many other shapes including curved, cylindrical, or spherical.
2. Underwater projection may be used to drive out or repel underwater creatures. For example, lake farmers may create a relative safe zone for baby fishes or for a hatching area by displaying on the projection screen predators to drive out adult fish which may eat the baby fishes or eggs. Thus, production yields may be increased. Further the apparatus 100 may be used for repelling sharks for beach safety by displaying a shark repellent such as ejected squid ink, killer whales, or sparks.
3. "Underwater Theater" or underwater movie uses may include allowing a user to experience visual and sound effects from a fish environment or moving terrestrial landscapes into an ocean environment. Underwater movie provides a special chance to watch movie and simulate a fish world. Now, people not only can imagine a fish world but also can experience it
4. Decorating or other ambiance uses include a wall-sized water/fish tank in a room, hotel or convention center with still features or moving features such as live fish or air bubbles. A back wall of the tank may be an NPD-LCD projection film. An ocean movie, an underwater activity or any other kind of underwater simulation can be projected on the back wall. Such a device can offer the impression of a much greater and deeper underwater space and provide more information or depth to a very limited actual space. Such uses may have significant decorating and attracting function.
5. Educational uses may include displaying how to protect oceans in coral reef area or showing background information of exhibits in an "Underwater Museum".
6. Business uses may include displaying information about underwater creatures in an "Underwater Zoo", where sea creatures are in underwater cages like zoo in land. Visitors with diving suit may know a lot of knowledge with great experience and enjoyment.
7. Advertising uses may include showing how an NPD-LCD underwater projection film/panel works; advertising for a product by showing an actual potential leaking weakness with adverse consequences; showing the power of a glue to fix leaks.
8. Fitness and exercise uses may include showing demonstrations for underwater yoga or other workout or showing a video or television program for an underwater treadmill user.



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- 9.** Training uses may include training for synchronized swimming or running.
- 10.** Uses for guiding underwater operations may include repairing or assembling an underwater oil well.
- 11.** Underwater therapy uses may include displaying instructions or demonstration videos for an underwater exercise.
- 12.** Entertainment uses may include presenting a birthday cake and candles at an underwater party or showing images of a bride and groom for use in an underwater marriage ceremony.
- 13.** Gaming uses may include stepping on projected images or laser shooting projected sea animals or other targets.
- 14.** Camouflage uses may include underwater projection panels that can be used to hide a submarine by showing surrounding images such as coral reef or sea-plant to increase difficulty to be identified from sky, so that the submarine is safer when in shoal water.
- 15.** Filmmaking uses may include making a filming studio by using a water tank for close-up shots while using a NPD-LCD projection screen/film installed on one or more walls of the tank for projecting images used in a longshot. Many underwater movie scenes can be made with a combination of true underwater scenes and simulated backgrounds on the projection screen.
- 16.** Photography uses include showing land animals in an underwater environment or generating an art effect with underwater lighting to view a statue. Suitable uses may also include photography background including displays of various backgrounds for photography for travelers wearing a diving suit.
- 17.** Research uses include studying fluid dynamics by directly showing fluid images and data; studying underwater images and sound effects; and studying responses or relationships of sea creatures with their prey or predators. Underwater projection provides new method to study and communicate with underwater creatures.
- 18.** Underwater display uses for swimming pools may include underwater TV for viewing during a swimming workout while wearing a snorkel in a still or running water pool. Further underwater display uses include showing a score or position for a race or enhancing the aesthetic conditions of a user during a swimming workout or while wearing a snorkel in a simulated ocean environment like a simulation of flying.
- 19.** Aquarium display uses include putting an NPD-LCD film on a side of an aquarium for watching projected TV when the film is in opaque state and for allowing the fishes to be seen when not watching TV and the NPD-LCD film is in clear state.
- 20.** “Underwater Park” uses may include many underwater projection displays showing all kind of scenes, paintings, decorating, maps, simulations, games, and allow visitors to play. Such treatments may reduce cost while increasing possibility for fun.