Film Processing:

HAVE YOUR EVER seen one of those old bottles in which someone has painstakingly built an entire ship? Just think how much time it took and how many difficulties were encountered. Well, if you think getting a ship into a bottle is difficult, listen to how we put a fully functional film processing lab into a cubbyhole onboard a ship.

We recently had an interesting teaching assignment from our alma mater, Brooks Institute of Photography, a noted school specializing in all aspects of photographic education. A 51-foot converted 1930 fishing trawler, The "Just Love," served as our home base for Brooks' Undersea Photography Program, which offered students an incredible learning environment.

We conducted classroom lectures and in-the-water instruction, but we found that the students needed immediate feedback by seeing the results of the day's underwater photo assignments. When the students went to sea for several days, we found that they would make the same mistakes over and over, and would not discover their errors until they processed their film on return to land. Because so much time passed between the actual photography and the end results, the students couldn't always remember exactly what they had done to achieve those results. So, we decided to install a film processing lab onboard.

Selecting the Processor

Over the years we have reviewed a lot of small film processors, each offering various features. The processor we needed had to be fairly compact, run off battery power, have its own temperature control, be completely automatic, have a self-cleaning system, have the capability to separate the effluents and store them in specific containers and yet be easy to operate. We felt that the film processor from Wing-Lynch was our answer. We went to the Wing-Lynch Corporation, located in Beaverton, Oregon, and talked to them about our problem. They assembled a modified E-6/C-41/T-Max film processor that fit all our specific requirements.

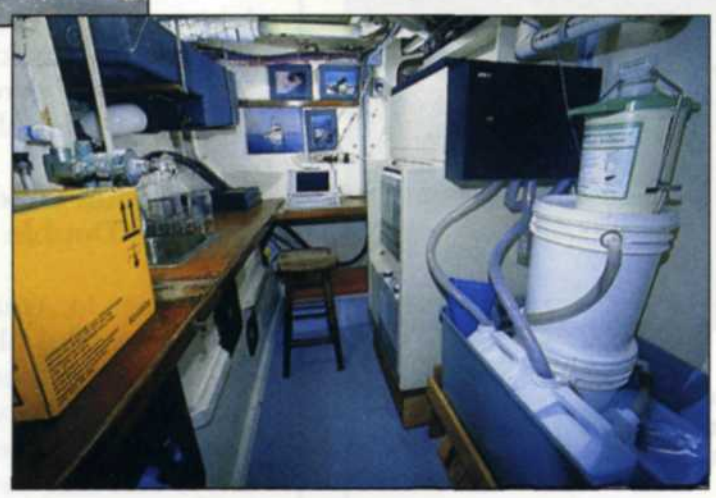
Fitting the Processor Into the Ship

After careful evaluation of all the possible locations for the processor on the "Just Love," we decided that the lowest point closest to the middle of the ship would have the least amount of pitch and roll. This was critical as we were going to be operating the processor in some rough weather.

The ideal location seemed to be a small utility room with a single berth. The keel of the ship ran through the back wall of this room, which would serve as an excellent resting place for the processor. The room also had hot and cold running water lines in the ceiling which could be tapped into for mixing water. Most importantly, the room could easily be darkened for film loading and it was located off the beaten path for most daily ship operations.

Once the decision was made, we removed the sleeping berth and bolted the processor to the back wall of the room so

The converted 1930 fishing trawler "Just Love" off the Santa Barbara coast in California.



Labs on Ships

Jack and Sue Drafahl

that the base rested on the keel. A large 12 volt marine battery was installed under the film-loading table and placed inside a high impact double-containment box slightly larger than the battery. A large wooden platform was constructed on the right side of the processor for holding the double-containment effluent and silver recovery system. A secondary double-containment system was also built towards the stern to hold effluent that would be offloaded for additional processing at Brooks' main campus. A stainless steel sink with a hot and cold line was installed for mixing chemistry. Finally the door and light leaking cracks were sealed and we were ready to mix chemistry and process film.

Setting Up for Mixing Chemistry

Two of the main problems facing us onboard were water usage, and the resulting effluent. We immediately realized that a special mixing procedure would have be designed to solve this problem.

The first step was to use only prepackaged 1 gallon processing kits. This eliminated the need to measure various millimeters of each chemical and the rinsing of each container afterwards. This also eliminated the possibility of cube containers leaking chemistry on the deck. We used a 2000 ml container for mixing all the chemistry, which was mixed in the order of the processing steps to avoid any contamination.

We started with the E-6 first developer, filling the vessel with 500ml of water and then adding the concentrate from the prepackaged bottle. We continued to add water until the container had 1800ml of solution. We poured the chemistry into the first developer storage tank in the processor and slowly filled the container with an additional 500ml of water, slowly turning it at angles so that the water rinsed all the chemistry off the sides of the container. We added this to the processor and repeated this step for an additional 500ml of water. The mixing container was now ready for mixing the next chemical without creating any unwanted effluent by additional rinsing.

In order to minimize the chemistry space in the processor, we also instituted a method for sharing the E-6 bleach and fixer with the C-41 process. The processor is programmed to draw from the C-41 developer and then to use the bleach and fixer from the E-6 containers. We have been doing this same procedure in our own lab for years with great results and no drawbacks.

The final two 5 gallon tanks in the bottom of the processor were filled with 100 degree water so that the heating system would not have to heat up the presoak and water rinses. This also made it possible to program the shortest possible rinse times to help reduce water usage.

Setting up the Effluent Systems

One of the best parts of the Wing-Lynch

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processor is its control of the effluent. Several diverter valves are located on the starboard side of the processor that act as a chemical sorting system. We used 4 of the possible 7 valves on this processor and assigned each to a specific type of effluent. The first diverter valve directed all preheat water to the first effluent container labeled "pre-rinse." The second valve diverted rinse water between steps to a second container la-beled "wash water/no fix." The third valve diverted all chemistry except fix to the third container labeled "full strength chemistry/no fix."

The fourth and final valve diverted fixer and fixer rinse water to a "Super Can" Silver recovery cartridge. This cartridge was attached to a second "Super Can" silver recovery cartridge, which in turn flowed into a container labeled "treated fixer." All containers were kept in a secondary containment system, so that any spills could be captured. Additional gloves, safety glasses, clean-up kits, eye wash and ventilation system were added to the room to complete the installation of the processor.

Film Loading Using the "Double Roll" System

In order to reduce effluent even more, we instituted a film loading system that allowed us to load two rolls of film per reel. This meant twice as much film could be processed in the same amount of chemistry. The cost savings with this double roll method also help offset the added cost of using prepackaged chemistry.

Using a leader puller, we pulled out the leaders on each roll, twin checked the film and clipped the leaders off. Each pair of rolls was taped back to back and set in a row on the loading table. We then turned off the light and grabbed a pair of rolls and loaded them as though they were a single roll.

When we reached the end of the rolls, we clipped off the cassettes and put the loaded reel in an 8x10 paper safe just in case a large wave hit the ship and knocked the rolls on the floor. With the double rolling method, we averaged over 55 rolls of film per gallon of chemistry with no loss of image quality.

Film Drying

Another major problem to overcome in our onboard lab was drying the film. We looked at a variety of devices, but space was at a premium. Right next to the darkroom was the shower stall. It provided us with enough room to hang the film in a dust-free environment, and was deemed off-limits during processing hours. At first we tried air drying, but found that the one-hour drying time slowed the entire

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processing cycle. Then we realized that the room next to the shower had a constant 95 de-gree dry heat coming from the ship's generator. We set up a system of piping the hot dry air through a filter system and down the walls of the shower. The drying time was reduced to 10 minutes.

Sea Trials

The first test of our floating lab was a three-day trip to Santa Rosa Island in the Channel Islands off Santa Barbara. When we arrived at our first anchorage, we mixed our first E-6 batch of chemistry and collected film from the hesitant students. We double-loaded six reels with 12 rolls of film, and started the processing run.

We found that the tight quarters of this new darkroom felt more like a cockpit but it held us firmly in place as the ship pitched and rolled. Thirty-five minutes later, the processor alarm signaled us to remove the film. The only shortcoming to double rolling is that it requires two people to hang film. One person separates the film while the other person wipes off the excess water.

One funny aspect of the drying shower was the pitch and roll of the ship. As the ship moved back and forth the film would swing back and forth in the shower. This worked fine as long as all the rolls were the same length. 36-exposure rolls swing differently than 24-exposure rolls, so we had to process the different lengths separately. After the trip was over we redesigned the drying shower with a wooden floor with clips at both ends, so the film was held firmly in place during pitch and roll.

By the second day of the trip the students were fighting to be the first to get their film processed. They were now able to see their mistakes almost immediately and work on correcting their errors on the next dive.

The next trip was a 10-day excursion to one of the most beautiful diving spots in the world—Santa Barbara Island, an island about 60 miles off the coast of Santa Barbara. We processed 24 rolls of film on the first day and the processing increased every day. Eventually, we tried C-41 and T-Max. All processing runs were successful. The enthusiasm amongst the students was contagious.

On the eighth day we decided to push our luck. The sea was very rough and walking around deck required a constant handhold. We told the captain we wanted to really try the processor and he told us in no uncertain terms that we were crazy. As we loaded the film, we could hear various objects in the darkroom sliding from side to side. Finally the film was loaded and the processor started.

What the captain didn't know was that the processor's intricate brain monitors the chemistry level in the processing trough, and if the level of chemistry is lowered because of pitch and roll, the processor compensates with the chemistry reserve in the processing tanks. We tried four processing runs in this rough weather, and the biggest problem was in the still-swinging film dryer!

At the conclusion of the course, the students and faculty determined that this had been one of the best underwater photography classes ever. The most improvement came during the 10-day trip, where the students saw their results every day. The lab was so successful that Brooks Institute has now added six new underwater photography courses available to the general public. The Wing-Lynch processor, with its sophisticated computer system, proved that it can maintain professional control of film processing on land and sea.

For further information on upcoming classes, contact Brooks Institute of Photography at 810 Alston Road, Santa Barbara, California 93108 or call (805) 966-3888.

Jack and Sue Drafahl own and operate a custom lab in Portland, OR. They are also professional photographers, specializing in underwater photography.