

# HURRICANE CAMILLE: A New Experience in Reclaiming Canned Seafood

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On August 17, 1969, hurricane Camille struck with unprecedented fury the coasts of Alabama, Louisiana, and Mississippi. She caused damage estimated at over one billion dollars. In Mississippi alone, 40,000 inhabitants suffered hardship, and about 35 miles of coastline were laid waste.

Most details concerning the storm and its effects have been documented on film and paper. It was a new experience in every respect. It is disconcerting to realize that neither the people nor the various governmental agencies were equipped to handle a disaster of such proportions. By using the Gulf Coast as a dramatic example, persons involved in a similar catastrophe in the future can profit from the experiences of those who cleaned up after Camille.

BCF personnel who were in Biloxi, Mississippi, the day after the storm, and who returned later to help clean up, observed the storm's effects on canned seafood products, and the results of efforts to recondition these products.

## THE SCENE

For the most part, the seafood industry of Mississippi is grouped on the beach facing the Gulf of Mexico and would bear the brunt of any hurricane. This was the case in Biloxi the day Camille struck. Canneries and processing houses that were not blown away were later reduced to rubble, or swept into the sea by 18-foot tides. On August 18, the day after the storm, 200,000 cases of canned seafoods worth about two million dollars littered warehouses, beachfronts, or were intermingled with wreckage, debris, and silt. There was no consolation for those whose stocks remained on pallets in warehouses because these too suffered water and silt damage.

For days, there was little or no clean fresh water; in most instances, when it was restored, water pressure was inadequate to effectively start the cleanup. Because of the time required to rebuild damaged electric motors, those who had private water systems were only slightly better off. Labor was al-

most nonexistent as people tried to restore the basic needs of living. Most people were in shock; they did not recover for days. Everyone was staggered by the task of rehabilitating homes and businesses. The future was bleak. Trying to determine just when to begin rebuilding was a task--and this situation can be expected again.

## THE NEED FOR A PLAN

Tools Needed: 1. Labor  
2. Trucks  
3. Warehouse

The only way to avoid a costly cleanup of canned stocks is to move them to a safe area before a destructive storm strikes. Except for relatively small quantities of merchandise, this would seldom be possible. Camille meandered over the Gulf for a week, but forecasters were unable to give a 24-hour advance notice on where she would strike. For this reason, only token quantities of merchandise were moved to safe areas.

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Fig. 1 - Aerial view of "Camery Row" Biloxi after hurricane Camille.



Fig. 2 - Some of 200,000 damaged cases of canned seafood in Biloxi.



Within each cannery, the decision about which to move--canned goods, machinery, or both--creates an additional demand on available trucking. To make the most of whatever advance notice is given, a company's plan for maximum evacuation should be developed well in advance of the storm. It should be put into action as soon as it is evident the storm will come close. Most hurricanes push tides of 12 to 15 feet. Canneries on high grounds would be safe from damaging tides, but there are few, if any, in the Gulf Coast area that are 15 feet above sea level. So it is reasonable to suggest that all canneries should have an evacuation plan.

It is difficult to determine what action should be taken after a storm until one has surveyed the damage to installations and stock. There are, however, certain basic steps that would be beneficial. These would require a plan not only for an individual canner, but for other canners and food brokers with large stocks of damaged canned goods.

The Biloxi cleanup was expedited by the finest type of cooperative action. Unfortunately, time was wasted conceiving and organizing it. Had there been a plan for united action prior to the storm, time would have been saved--the time during which cans deteriorated.

#### Salvage Canned Products

It is important to know that 75 percent or more of the canned goods can be reclaimed almost to original newness. For this reason, and because canned stocks represent needed collateral, I believe that all efforts should be directed to salvaging these canned products.

#### THE CLEANUP

- Tools Needed: 1. Labor  
2. Packing cases

After a storm, there may be some uncertainty about what to rebuild first. Assuming



Fig. 3 - Cleanup begins in Biloxi.



it is salvaging canned stocks, TIME becomes vitally important because, inevitably, in TIME canned goods will be worthless. In TIME, the action of saltwater and air will create rust that causes pinholes in a can, or the can will lose eye appeal from blotches in the tin plate. Cans should be reconditioned as fast as possible. Because labor will be short, this will not be easy. Therefore, it would be prudent to hire as much help as possible immediately after a storm.

If work cannot proceed because of the loss of a structure under which to work, the cans should be submerged in water. Steel will not rust as rapidly under water as when damp and exposed to air. In 1947, canned salmon in the 'S.S. Salmon' that sank in 135 feet of water was in good condition after  $2\frac{1}{2}$  months; the cans were opened, the salmon removed, repacked, and processed in new cans.

Swimming pools could be used, or a pool constructed by building mud levees covered with plio-film sheets. Hosing the stock with water does not provide the same effect. In fact, hosing silt and salt deposits from the cans provides a perfect situation for rust to develop more rapidly.

It is probable that neither fresh water nor power would be available after a hurricane, but some measures can be taken toward salvaging canned goods. It is desirable to remove cans from wet packing cases, and labels from all cans. Residual chemicals in the paper combine with the dampness to set up an action that speeds rust formation. In Biloxi, cases that remained on pallets, but were saturated, remained wet in the center of the pallet for three months. Even if the cases and labels had dried, as some did on the outside, the rust formation was worse than on those that had been removed. The percentage of cans that were recovered from wet cases was considerably less than that of cans removed from such an environment. An added disadvantage was that production was hindered because more time was required to work from wet cases than from dry ones. The cases disintegrated when handled, spilling the cans; rust will develop more rapidly, especially along seams and at points where labels are attached to cans.

If utilities have not been restored, the cans should be repacked in dry or new packing cases and, later, treated more. For lack of cases, some canners in Biloxi stored cans in retort baskets. As a temporary measure this

could be helpful, but in areas of high humidity, this is undesirable. Exposed cans will not be much better off than if left in wet cases. The recovery rate of cans held this way was less than those stored in dry cartons.

#### WHEN UTILITIES ARE RESTORED

- Tools Needed:
1. Labor
  2. Fresh water
  3. Detergent
  4. Scrubbing brushes
  5. Steel wool or power buffer
  6. Heat
  7. Rust-preventive oil
  8. New packing cases

Up to this point, everything accomplished was done as a temporary measure. Now cleaning should begin in earnest. Whether accomplished manually or mechanically, the objective is the same: to remove salt, dirt, silt, labels, and rust. It takes at least three weeks to arrange and obtain the services of a mechanical cleaner, so the following is directed at those who wish to clean their canned goods by hand.

A surprising amount of stock can be rejuvenated simply by scrubbing the cans in warm water and detergent. Several Biloxi canners depended entirely on this method for relatively small stocks of canned goods; if accomplished promptly, there is little reason to worry about later effects. Cans showing signs of light surface rust should be set aside for another group of workers to clean with steel wool. A power buffer filled with a fine wire or bronze brush will save much labor. Cans should then be immersed in water held at  $180^{\circ}$  F., and then dried. Normally, at this temperature, cans will dry without additional effort; if not, they should be passed through a wind tunnel or dried by compressed air.

For several reasons, no attempt was made to recondition unlacquered cans during the Biloxi cleanup. The high unit value of canned shrimp, oysters, and crabmeat made it imperative that these cans receive first consideration. These products were all packed in lacquered, rust-resistant cans. During the time needed for hand-cleaning lacquered cans, almost all unlacquered cans became hopelessly rusted. In Biloxi, only items of low unit cost were in unlacquered cans--fruit drinks and pet food. This should not be



construed as reason not to clean items of low unit cost, because the mechanical cleaners that were used in Biloxi were designed for items of this type--beans, tomatoes, fruit cocktail, etc. Unlacquered cans and badly dented lacquered cans seem to rust at the same rate. Therefore, when cleaning up small stocks, do not separate the two--treat both equally.

On cans that have not been buffed, the lacquer will remain intact. The cans can be packed in new cases, held for at least two weeks, be inspected and defective cans pulled, and then marketed. In Biloxi, the U.S. Food and Drug Administration insisted that all cans not mechanically cleaned should be dipped in water containing 0.2 percent (200 parts per million) free chlorine. If this is necessary, it should be done after hand scrubbing, but prior to flushing cans in 180° F. water. While still warm, cans with all or part of the lacquer removed should be sprayed or dipped in a solution of one part mineral spirits and one part rust-preventive oil, be packed in new cases, and held for observation. A rust-preventive oil, available nationally, is sold in 52-gallon drums under the brand name "Oakite." This brand is mentioned for lack of other names. It does not prevent use of another product that could be superior.

Using only a mechanical lift truck as a labor saver, one Biloxi canner estimated that it cost \$1.00 to clean a case of 24 307/113-type cans. Wages were fixed at the time at \$1.60 per hour. This cost could be reduced by using a conveyor.

#### EXTREME CONDITIONS

- Tools Needed:
1. Labor
  2. Steam
  3. Water
  4. Chemicals
  5. Mechanical cleaner
  6. New packing cases

A mechanical cleaner and derusting machine should be used where there is a delay in organizing can-cleaning operations, or where the amount is so great that the race against the formation of rust is being lost. In Biloxi, where most canners had 25,000 or more cases to be cleaned, rust developed faster than hand cleaning could arrest it.

Where large stocks are being hand cleaned, at some point the percentage of cans lost will become so great that it will be unprofitable to continue operations. This should be expected if a mechanical cleaner is not available to speed the can cleanup. When this will become unprofitable is controlled by variables: how long cans have been stored prior to cleaning; how badly they are damaged or bent; what pre-conditioning they received. It will be the individual's determination where this condition will exist. He will take into consideration cost of producing the product, cost of cleaning, percentage of cans being recovered, and resale value.

The mechanical cleaner used in Biloxi cleaned and derusted cans at a rate of 1,000 to 2,000 cases of 24 cans on each machine per 10-hour shift. The wide variation in production was due to differences in can sizes, the extent they were bent, and degree rusted. Badly rusted cans required longer processing.

Except for one unit of the Warner assembly, cleaning consists of running cans between a series of rotating brushes; the cans are sprayed with water under high pressure, and dried. The exception is an electro-cleaning unit that derusts cans using high amperages, low voltages, and chemicals. The principle is the opposite of electroplating.

A layout of the Warner machine follows. These machines will process all sizes that roll on edge, from 307/113 through one-gallon No. 12 cans. Processing large quantities will lower unit cost. This is good reason why canners outside the seafood industry--vegetable canners and others--who may have damaged stocks should also be considered when the idea of obtaining a machine is discussed.

#### Mechanical Cleaning Superior

Cans mechanically cleaned are superior to those done by hand. They are restored to almost new. Rust is removed or deactivated. Because the caustics and solutions are held at relatively high temperatures (180° F.), the cans are sanitized. Because the process removes all U.S. lacquers, and possibly some foreign, the cans are fogged during the final stages of processing with a protective coating of rust-preventive oil. Thereafter, they may be packed in new cases and held for observation.



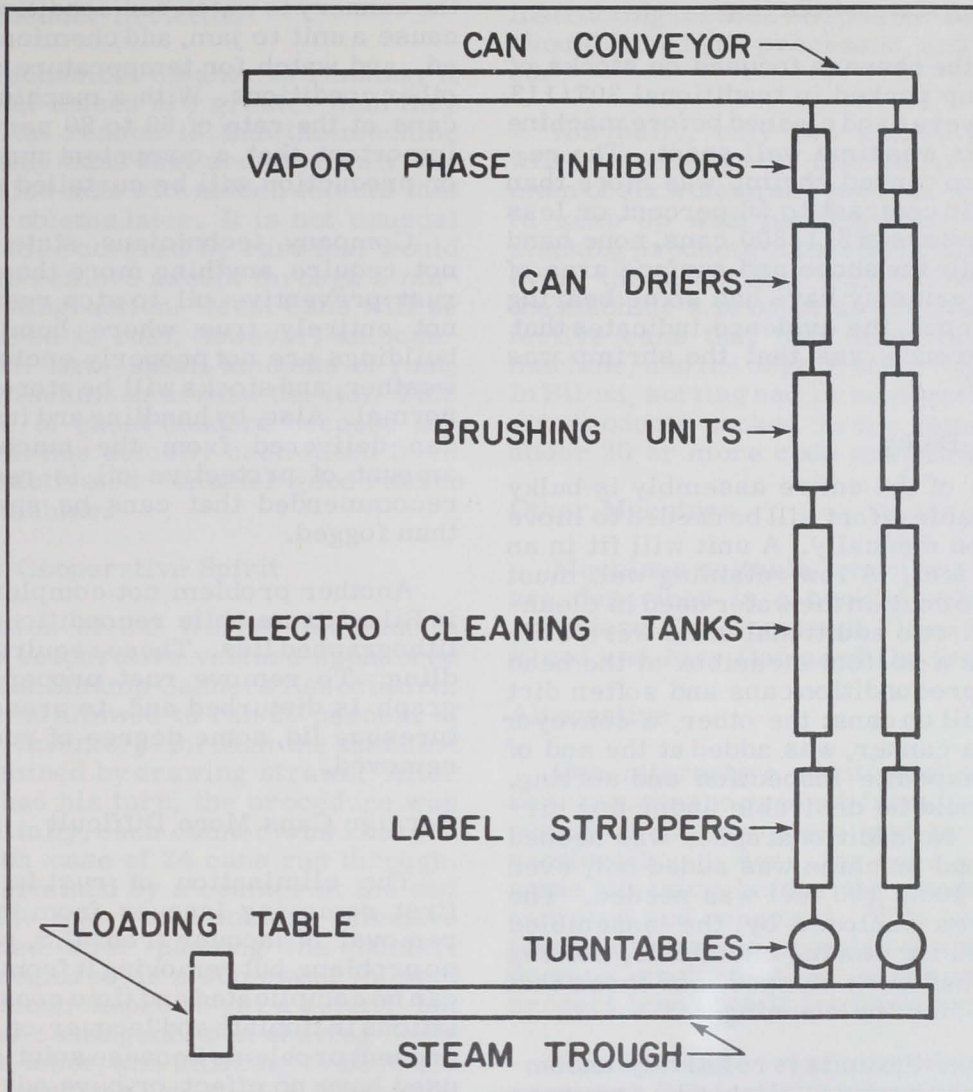


Fig. 4 - Layout of Lansing B. Warner machine.

#### 2-Week Quarantine Period

It is imperative that ALL reconditioned cans be held at least two weeks (at 70-80° F.). During this time, defective cans will reveal themselves. After this quarantine period, each case should be inspected and "swells" removed because "swells" likely will become "leakers" -- and the brine in which most seafoods are packed will spray other cans and cause them to rust rapidly.

#### Disadvantages of Mechanical Cleaner

There are some disadvantages or inconveniences in using a mechanical cleaner. Under most conditions, the machine will not be made available for quantities less than 20,000 cases, unless the user is insured by Lansing B. Warner, Inc. Based on fixed costs and cost of cleaning large quantities, it probably would

be economically impractical for canner and machine owner to consider smaller quantities; but again this could vary where goods of high unit value are involved.

Arrangements to obtain a machine were made through Lansing B. Warner, Inc., 4210 Peterson Avenue, Chicago, Illinois 60646. Its representatives will wish to inspect damaged goods before confirming shipment, but this would protect the canner as much as the machine operators. Only then will one or more machines, stored in Greenwich, Ohio, be loaded on trucks and shipped. Assuming water and steam are available, a week is needed after the machine arrives to get it operable. This time-consuming procedure is frustrating when time is a prime factor. It emphasizes need to continue hand-cleaning operations while awaiting machine.



## Hand Cleaning Canned Shrimp

In Biloxi, the canners focused on stocks of canned shrimp packed in traditional 307/113 cans. Most were hand cleaned before machine arrived. This was time well spent. The recovery rate on canned shrimp was more than 80 percent--in contrast to 50 percent or less for canned oysters in 211/300 cans, none hand cleaned. While the shape and surface area of the 211/300 can may have had some bearing on this difference, the evidence indicates that the big difference was that the shrimp was hand cleaned.

## Assembly Is Bulky

Each unit of the entire assembly is bulky and considerable effort will be needed to move it into position manually. A unit will fit in an area 15 x 75 feet. A low retaining wall must be around it to contain the water used in cleaning. In Biloxi, two additional units were added. One was a 60-foot steambox at the head of the line to precondition cans and soften dirt and labels still on cans; the other, a conveyor supplied by a canner, was added at the end of the line to expedite inspection and sorting. The latter would be desirable under any circumstances. No additional space was needed when a second machine was added but, even so, an area 100 x 100 feet was needed. The U-shaped area enclosed by the assembled units was used for storing chemicals, holding stocks that had been cleaned, and those that were next in line for cleaning.

Assembly of the units is relatively uncomplicated and can be accomplished by four mechanically inclined men working under the supervision of a company technician. It would be advantageous, however, if one were a welder. Sixty hours were needed to assemble each machine in Biloxi; another 24 hours to get the units adjusted and the chemical portioned to achieve desired results. Most fittings required to customize the machine to a specific location can be obtained from a good hardware company. Operating under normal conditions, 1,000 pounds of chemicals are needed each 6 days. Although the chemicals are not unusual, they probably will have to be ordered from a fairly large city; delivery problems can develop.

## 2 Men Needed Nearby

After the units become operational, two mechanically competent men remained nearby at all times. One was the company technician, who had trained a helper supplied by

the cannery to watch for conditions that would cause a unit to jam, add chemicals when needed, and watch for temperature variation and other conditions. With a machine processing cans at the rate of 60 to 80 per minute, it is important that a competent man be selected or production will be curtailed severely.

Company technicians state that cans do not require anything more than fogging with rust-preventive oil to stop rusting. This is not entirely true where humidity is high, buildings are not properly enclosed from the weather, and stocks will be stored longer than normal. Also, by handling and inspecting each can delivered from the machine, a small amount of protective oil is removed. It is recommended that cans be sprayed rather than fogged.

Another problem not completely resolved in Biloxi came while reconditioning cans with lithographed lids. These require special handling. To remove rust properly, the lithograph is disturbed and, to preserve the picturesque lid, some degree of rust will not be removed.

## Foreign Cans More Difficult

The elimination of rust is dependent on first removing lacquer from the cans. The removal of lacquer from U.S. cans presents no problem, but removing it from foreign cans can be complicated and time consuming. Variations in tinplate and lacquer on foreign cans present problems because solutions normally used have no effect, or have adverse effects, on the materials in these cans.

In Biloxi, an attempt was made to clean about 3,500 cases of goods packed in cans from overseas, but the results were unsatisfactory. Without advance research to determine solutions and voltages necessary to produce a desirable finished product, attempts to derust cans from abroad in a Warner machine should be discouraged. It would be well even with U.S. cans. Because of the possibility of changes in the plate and lacquer, samples of cans to be cleaned should be analyzed by the machine operators to avoid last-minute disappointments.

With special equipment, lacquer can be replaced on reconditioned cans. It was considered at one point during the Biloxi cleanup, but was never attempted. The pros and cons are purely speculative.



## Mechanical Cleaner in Action

When a mechanical cleaner is running, it will appear that losses are greater than they should be. The reason is that the machine reveals not only cans that are obviously defective--but also cans with hidden defects that will cause problems later. It is not unusual for a pinhole to be covered by rust that would be difficult to remove except through a machine's derusting action. Most cans will be 100 percent free of rust; however, an occasional can will have small amounts of rust, particularly in seams or around the lid. This should not be of great concern because any rust that is left has actually been lifted from the can and deactivated--another good reason for using a machine.

## Community's Cooperative Spirit

The operation of the Warner machine in Biloxi was a cooperative venture sponsored by the American Shrimp Cannery Association. Each canner was allowed to run 20 percent of his damaged inventory through the machine with lot determined by drawing straws. After each canner had his turn, the procedure was repeated. Initially, each canner was charged \$1.30 for each case of 24 cans run through. This was determined by a counter at the end of the machine and would include defective cans discarded after passing the counter. This was recognized as a somewhat inflated cost. Each canner hoped to get a refund, but the refund was contingent upon shaving costs for materials, labor, and utilizing to best advantage the services of a BCF Marketing Specialist and 8 Technologists from the BCF Pascagoula Fisheries Station.

It is desirable to select persons who can perform best at every point of the operation. This is especially true at the beginning and end of the cleaning line. Those at the start can reduce costs by culling cans that are obviously defective, or those so badly bent that they would cause the machine to jam. Personnel who inspect cans coming from the machine are important. By eliminating a "leaker" or "swell" then, they will save all other good cans in a case that would be ruined by a "leaker" spraying brine later. The work performed by relatively unskilled workers in Biloxi cannot be discredited at this time by noting the greater percentage of defective cans in cases packed during the early weeks of the cleanup than later. This is evidence that more time should have been devoted to

instructing loaders and packers on which cans should have been processed, and which packed.

Normally, only two women and one man will be needed at the starting point. A minimum of six women and one man will be needed to keep up with packing cans in cases and stacking products at the end of the line. However, the latter may vary. It will depend on the machine's production rate, number of defective cans that find their way through the machine, and the degree of sorting to be done. In Biloxi, sorting had to be done on 12 different products packed in the same type of can under 20 or more code numbers.

## Other Machines

Machines suitable for salvaging purposes are described in a booklet published by the American Can Company: "Reconditioning of Flood and Fire Damaged Canned Goods."

## Alternative

One alternative mentioned earlier would be to remove the product from damaged cans, repack it in new cans, and process it conventionally. If done, the cans would require some cleaning before the product could be removed and repacked. This alternative offers considerable promise if automatic can-opening equipment is available and if the product lends itself to reprocessing.

Another alternative deserves careful scrutiny. It is to sell damaged stock to a salvor. At the time of this report, no damaged canned goods in Biloxi were sold this way.

## SUMMARY

Where large stocks are involved, a patented cleaner like the one used by Biloxi cannery should be obtained with all haste, even though the stock is not rusted at the time the cans are first inspected. This feeling of the Biloxi cannery is reflected by the number of cases of damaged goods returned to the market:

29,970 cases oysters in 211/300 cans
5,919 cases oysters and oyster stew in 311/300 cans
1,813 cases shrimp in 307/208 cans
54,162 cases shrimp and crabmeat in 307/113 cans



The initial cost of accomplishing this was \$1.30 per case; in the end, the cost through refunds was  $47\frac{1}{16}\text{¢}$  per case. Of the \$123,239.90 collected to clean the cans, \$78,965 was refunded.

#### BEFORE A HURRICANE

1. Develop a tentative plan for evacuation.
2. Keep posted on weather developments.
3. Commandeer labor and transport to expedite evacuation.

#### AFTER HURRICANE

1. Survey extent of damage to structure and merchandise.
2. Provide dry working area.
3. Collect damaged canned goods.
4. Remove labels from water-damaged cans.
5. Repack cans in dry cases.
6. Ascertain extent of damaged goods held by other canners.
7. Consider procurement of mechanical cleaner that also could be used by other canners.
8. Emphasize manual cleanup of cans when utilities are restored.

