Amoco Cadiz Incident Points Up the Elusive Goal of Tanker Safety

The wreck of the *Amoco Cadiz* on the north coast of Brittany has come as only the latest in a long series of unpleasant reminders that oil spills and tanker safety remain a massive and very much unresolved environmental problem. With the escape of the supertanker's entire cargo of 1,600,000 barrels of Saudi Arabian crude oil and the pollution of more than 100 miles of shoreline, this spill has been of such catastrophic proportions as to seem designed to mock the hesitant and long-drawn-out efforts by the maritime nations to agree upon better safety standards and antipollution measures. And, ironically, the spill occurred just 1 month after the delegates to the International Conference on Tanker Safety and Pollution Prevention in London went home in a self-congratulatory mood.

No authoritative reports are in hand yet as to how the *Amoco Cadiz* was lost or as to the true extent of the economic and ecological damage. But, if news accounts are borne out, this episode will point up the international community's past failure to require that tankers be designed and equipped to minimize the possibility of wrecks and spills and also its failure to provide greater compensation when bad spills do occur.

The *Amoco Cadiz*, a tanker of 233,690 deadweight tons (dwt) built in Spain in 1974 and registered in Liberia, is reported to have gone aground because her steering system failed—a circumstance which has invited speculation that the difficulty perhaps could have been overcome if greater redundancy had been provided in the steering control mechanism. At the same time, it is evident from the magnitude of the spill that there is no assurance that the Standard Oil Company of Indiana, owner of the *Amoco Cadiz*, will make full restitution to France and to the people of Brittany who are suffering the spill's effects.

Under the existing international law and voluntary industry agreements applicable to oil spill liability, up to $30 million can be paid to meet clean-up costs and damages—but ecological damages may not be covered. How much the costs and damages in the *Amoco Cadiz* incident actually will be is not known. But, with the effects of the spill expected to persist for a decade or more in some places, as in the tidal marshes, the total could far exceed the $30-million maximum. If all of the ecological and environmental damages can somehow be determined along with the more easily measured losses suffered by economic interests such as fishermen and hotel owners, the total could be truly immense.

The wreck of the *Amoco Cadiz* represents a part of the pollution problem associated with oil tankers that is both dramatic and relatively easy to grasp. A recent analysis by the congessional Office of Technology Assessment shows that from 1969 to 1974 there were more than 500 tanker accidents that involved oil spills, and that more than 1 million tons of oil escaped altogether.

As would be expected, the accidents reported included many groundings, rammings, collisions, and explosions. But one of the more frequent happenings was listed under the heading of "structural failure," which in the most severe cases meant that an old rust bucket had simply broken up at sea and sunk. In fact, structural failures were responsible for nearly a third of all the oil that was lost to the oceans, or even more than was lost from groundings and collisions.

What makes this seem particularly ominous is the fact that nearly the entire present generation of giant supertankers consists of ships that have been launched within the last decade. In 1966 there was only one tanker in the world of greater than 200,000 dwt; at the end of 1975 there were 583 of these "very large crude carriers," or VLCC's, in a total world tanker population of about 6800. If past experience with other classes of tankers can be taken as a guide, in the 1980's when these superships become about 15 years old, the incidence of structural failures—and catastrophic oil spills—will rise dramatically.

The other part of the pollution problem associated with tankers has to do with routine tank cleaning and ballasting operations. Indeed, this is in a sense the larger part. The "chronic" pollution resulting from cleaning and ballasting operations is several times greater in terms of oil outflow than the pollution resulting from tanker accidents.

Ballasting operations are especially notorious not only because they represent the biggest part of the chronic pollution problem but also because they need not be a source of pollution at all. Some pollution inevitably results when seawater ballast is discharged from tanks which earlier have contained crude oil or petroleum products. But a sure way to prevent this pollution is to provide segregated ballast tanks (SBT's).

With a SBT system, all tanks and piping for ballast are completely separate from those for crude oil or products. An additional advantage of the SBT system is that the ballast tanks can be placed so as to give the vessel some protection in the event of a grounding or collision. For instance, ballast can be put in the space between the two bottoms of a tanker whose "double bottom" might, in the event of a grounding on a rocky shoal, prevent the rupture of the oil storage tanks and give the vessel enough structural strength to avoid breakup.

The recent London conference on tanker safety and pollution prevention was sponsored by the United Nations' Intergovernmental Maritime Consultative Organization (IMCO). IMCO has been regarded by many people—including some men of practical politics (such as Senator Warren Magnuson of Washington and Senator Russell Long of Louisiana) who do not blush easily—as a forum dominated by shipowners who want to minimize their capital outlay and operating costs despite the greater risk of chronic pollution and accidents.

Accordingly, a year or so ago no one expected IMCO ever to go much beyond the commitments made at the International Convention for the Prevention of Pollution from Ships in 1973. The main achievement of that earlier convention was an agreement that segregated ballast systems would be required for all *new* tankers of 70,000 dwt or over. Smaller tankers would not be required to have SBT's, but they would have to have automatic monitoring devices to ensure that excessive pollution would not go undetected. However, these advances were soon to seem illusory because virtually no progress was made toward the treaty's ratification.

Yet events took a turn in the late winter of 1977 that eventually put IMCO in a more positive frame of mind. A series of tanker accidents occurred in or near the coastal waters of the United States in December 1976, the most publicized of which was the grounding and breakup of the *Argo Merchant* 28 miles southeast of Nantucket Island.

Reacting to the spills, the Senate Committee on Commerce, Science, and Transportation began to move on the tanker safety bill sponsored by its chairman, Senator Magnuson. At the same time, President Carter, in his special

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message of 17 March 1977 on marine oil pollution, announced that he was directing the Department of Transportation to develop new rules with respect to all oil tankers of over 20,000 dwt, U.S. or foreign, which call at American ports.

These rules would call for double bottoms on all new tankers and segregated ballast systems on all tankers, new or old. Further, all tankers would have to be equipped to inject inert gas (such as stack gas) into the cargo tanks as they are emptied so as to reduce the tanks' oxygen content to a level low enough to make an explosion impossible. In addition, all tankers would have to have a backup radar, including a collision avoidance system, and improved emergency steering equipment.

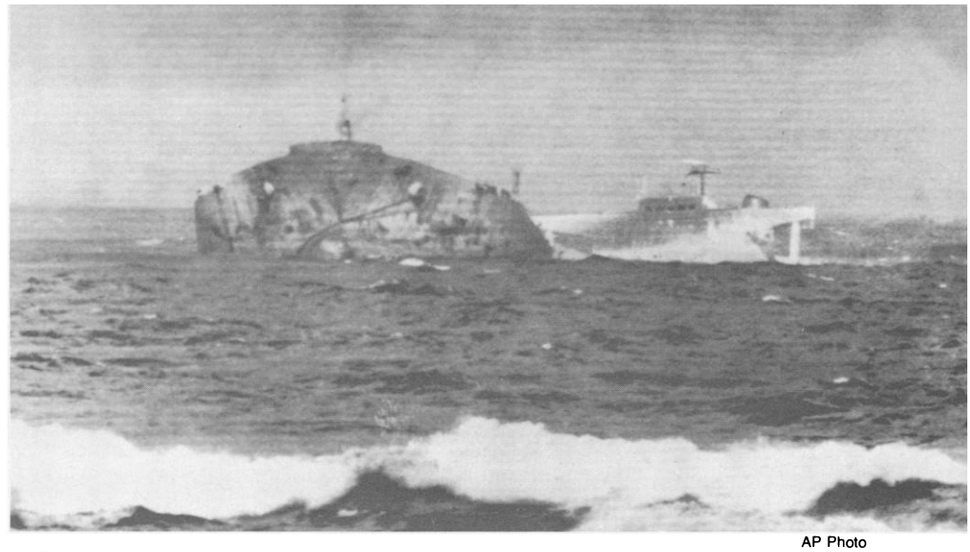
For the other member nations of IMCO these developments meant that the United States was about to act unilaterally. Futhermore, if the United States took such action, nearly all the maritime nations would be affected because a third or more of all the oil and petroleum products transported by tanker is bound for American ports.

In light of these considerations, delegates of the IMCO nations, whatever their true feelings or inclinations, wanted the 1978 convention to accomplish enough to convince the United States that it should not, and need not, take action beyond what IMCO itself had agreed to. A few of the member nations, possibly including the Soviet Union, were in favor of the U.S. proposals from the outset. But many others were not.

The United Kingdom, which is itself a shipowner inasmuch as it owns a majority share in British Petroleum, led the opposition to the proposal that all tankers above 20,000 dwt should be fitted with segregated ballast systems. Many delegates of less developed nations were a part of this opposition. They seemed persuaded that retrofitting SBT systems on existing ships is a luxury for the rich, even though it is estimated that the world's entire tanker fleet could be equipped with such systems at relatively minor cost to the consumer, such as an additional half cent a gallon for gasoline.

This is how one American observer has described the scene at IMCO:

> There were always two levels of negotiations in progress: those involved in the technical working groups and drafting parties, and those involved in the political manuevering around the corridors and behind closed doors. These latter negotiations quickly [led to] a series of confrontations which threatened the very existence of IMCO; but, after the first week and an intensive weekend of negotiations, a so-called "composite package" was arrived at which eventually was accepted in committee and plenary with little or no change.



AP Photo

The Amoco Cadiz *as seen from French shore where she drifted aground and broke up.*

This package contained much that the United States had asked for, especially with respect to construction standards for new ships. But some of the things left out were of such central importance that Deputy Secretary of Transportation Alan Butchman has had to stretch the facts to claim that "most" of President Carter's goals have been achieved at IMCO.

The IMCO agreement falls short of what the American negotiators wanted chiefly with respect to SBT's and existing tankers, which will make up much the greater part of the world tanker fleet for many years to come. In particular, for these existing ships the so-called crude oil washing system, or COW, was put forward and accepted as an alternative to SBT's. The U.S. delegation had argued that while COW would be a valuable supplement to SBT's, it would not be an adequate substitute. (In the COW system, crude oil is in effect used as a solvent, with the oil sprayed on the inside of cargo tanks to remove much of the "clingage" before those tanks are used again to carry ballast.)

Besides being neither as effective nor as self-enforcing as SBT's from a pollution-prevention standpoint, COW can present an air pollution problem, especially for ports in large metropolitan areas where the hydrocarbon emissions are already excessive. The California Air Pollution Board opposes the use of COW for this very reason.

Despite the weaknesses of the IMCO convention, all of the interested agencies in Washington, including the National Oceanic and Atmospheric Administration (NOAA) and the Council on Environmental Quality (CEQ), believe that it represents significant progress and deserves early ratification. Regardless of whether ratification is completed or not, the Department of Transportation will put all of the agreed-upon measures into effect over the next few years as called for in the IMCO implementation schedule. And, in all likelihood, Congress will enact a tanker safety law giving specific statutory sanction to these measures. Such actions by Congress and the Executive Branch should in themselves hasten ratification worldwide.

But with the IMCO agreement representing only a half a loaf at best, agencies such as NOAA and CEQ, together with the environmental groups that have been lobbying for stronger oil spill prevention measures, will be seeking further gains. Some additional headway may be made this June at an IMCO conference on the training and certification of seafarers, which constitutes no small part of the tanker safety problem inasmuch as many accidents are ascribable to human error. Certain foreign nations, including some of the principal flag-of-convenience countries, have been notably lax in their certification standards.

Still further progress could come in the fall when IMCO holds a conference to consider the adoption of uniform standards as to the number of deck and engineering officers and unlicensed crew members required for tankers. As matters now stand, each maritime nation sets its own "manning" standards, and some allow tankers to set sail without the crew strength that is likely to be needed in emergencies.

Once uniform standards have been established for manning and crew training and certification, compliance with those standards would become a condition for use of American ports, as will be true in the case of the tanker design and construction standards. The effectiveness of the Coast Guard's program of tanker inspections, which has been stepped up in recent years, could thereby be strengthened further.

Establishment of rules restricting the movement of tankers, and especially supertankers, represents another approach to tanker safety that is beginning to receive attention. After the wreck of the *Amoco Cadiz*, the French Cabinet is reported to have adopted a regulation requiring tankers to remain at least 7 miles off the coast instead of 5, as at present. CEQ also has suggested that mandatory routes should perhaps be established to keep supertankers away from rocky shores and narrow passages.

The administrator of NOAA, Richard A. Frank, has told *Science* that his agency's marine sanctuary program could be expanded in response to the problem of tanker safety. With the establishment of such sanctuaries by NOAA, which could only act with the concurrence of states whose coastal waters would be affected, tanker traffic could be either restricted or prohibited in certain hazardous and environmentally sensitive areas. Some actions of this kind are also possible under the Ports and Waterways Safety Act of 1972, as Secretary of Transportation Brock Adams recently demonstrated by at least temporarily banning tankers of over 125,000 dwt from Puget Sound; the secretary acted after the U.S. Supreme Court held that the federal law was preemptive and that a ban on large tankers imposed by the state of Washington could not stand.

Congress may have a particularly important opportunity to advance the cause of tanker safety now as it moves to complete action on the long-unresolved issue of oil spill liability. The IMCO conferences on this problem, held in 1969 and 1971, produced agreements deemed so inadequate that the Senate has not bothered to ratify them. What seems called for is a liability and compensation program that would provide not only more generous compensation in the event of spills but also strong economic incentives for the tanker industry to emphasize safety in the design and operation of its ships. "This has never been stressed enough," says Frank, who before coming to NOAA last year was with the Center for Law and Social Policy (CLSP), a Washington-based public interest law group.

James N. Barnes, the CLSP attorney who has been speaking for several of the national environmental groups on the tanker safety issue since Frank's departure, believes that no limit should be placed on the liability of tanker owners for damages. Last year, the House of Representatives, no doubt influenced by industry arguments that insurance simply would not be available without a liability ceiling, passed a bill that would limit the liability in a single incident to $30 million. Claims for damages in excess of that amount would be met from a compensation fund to be raised mainly by a 3-cent-per-barrel fee levied on oil delivered by tanker to bulk purchasers.

But Barnes points out that, with the help of government "reinsurance" plans, private underwriters are already providing insurance against the potentially catastrophic losses that could result from calamities such as urban riots and floods. In his view, such underwriters could make insurance available at prices that would be acceptable to all tanker owners except those with bad safety records or substandard ships. As for the latter, he said, "driving [them] out of business is a desirable goal and one which a per-barrel tax cannot achieve."

Whatever the response of IMCO and the U.S. government to the tanker safety and oil spill problem, the *Amoco Cadiz* incident underscores with stark emphasis the fact that nothing has yet been done to keep this problem from assuming ever larger and more catastrophic proportions. An adequate response may require all of the previously cited remedies—better tanker construction and operating standards, stiffer inspections, prescribed tanker routes and marine sanctuaries, and oil spill liability laws that make tanker safety economically compelling. Without a concerted national and international effort to these ends, the devastating black tide that has visited Brittany is likely to visit many other shores, again and again.

—LUTHER J. CARTER

A Tangled Tale from the Biology Classroom

The following letter was sent to the White House and given to Amy to reply to. She dropped it on her way to school and it was picked up by a tourist from Princeton, who delivered it to Science.

—N.W.

Dear President Carter

The name of my school is the Harvard Medical School. You may have read in the newspapers that there was a boy here called Charlie Thomas who used to do experiments with recombinant DNA during biology class and who was told to stop them last December by the grown-ups at the National Institutes of Health.

Now the National Institutes of Health has written a bad report card about Charlie, it is called the Schriver report. But the prefects at my school have written another report which shows that Charlie and our committee had lots of good excuses for what they did, and that boys at other schools may have done just the same, it was just that Charlie got caught which isn't fair. I want to explain in this letter why nobody is really to blame for what happened and that it wasn't a big deal anyway because nobody could have got hurt.

Basically it is all the fault of the boys at another school. I should not mention their name but it is the University of California San Francisco. In the biology class there they wanted to do an experiment so much that they did it even after they had been told by one of the other boys that it would be breaking the NIH rules. When the prefects there found out, they didn't do anything about it for a long time and then they said it was basically the NIH's fault that the rules had gotten to be broken.

A senator in Congress called Senator Stevenson was very cross with the boys at UCSF. He made them come all the way to Washington and was very mean to them. He said things like, "You say you don't want legislation. If there is legislation, you gentlemen would be the authors of it." (He meant they had been so naughty he might actually have to write a law to say the rules had to be kept.)

The senator was also mean even to the grown-ups at NIH. So when it got out that Charlie might be in trouble the NIH people said he had to stop working in his lab at once until their Mr. Schriver found out what the matter was.

Here is what our prefects at Harvard say happened, basically. They say,

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