

# Artificial structures and traditional uses of the sea

## The field of conflict

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**The multiplication of artificial installations in the past two decades has raised the problem of their coexistence with traditional uses of the sea. Artificial structures can have an impact on marine activities as a result of their stationary position in a space used mainly by mobile craft and because of the potentially dangerous or disruptive activities for which they are sometimes intended. The establishment of permanent installations will have to be regulated in order to ensure safety at sea as well as an orderly development to accommodate and balance the conflicting interests of all ocean users.**

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<sup>1</sup>For a listing of most existing offshore structures, see N. Papadakis, *The International Legal Regime of Artificial Islands*, Sijthoff, Leyden, 1977, pp 11–39.

<sup>2</sup>Geneva Convention on the Continental Shelf, 1958, Article 5/2.

<sup>3</sup>See Convention on the Law of the Sea, 1982, Articles 55/3 and 60/7, as compared to the Geneva Convention on the Continental Shelf, Article 5/1.

The past two decades have witnessed a major change in marine activities. For centuries, these were largely limited to navigation and fishing. Today, the development of modern technology and the need to discover new energy sources and explore new areas off the overpopulated coastal zones have led to an increased and diversified marine activity. Ships, traditional users of the sea, are no longer alone. Fixed structures, intended to be used offshore for industrial or scientific purposes, have appeared, challenging mobile crafts for priority in ocean space.

What are these artificial structures? Often called 'artificial islands' because they make it possible for people to live and work in the middle of the ocean as they would on an island, they are difficult to define on account of the variety of their types and uses.<sup>1</sup> They range from a small observation buoy designed to gather scientific data to the huge oil complex or deepwater port covering several acres of the sea – sea-cities, floating factories or broadcasting stations also belong to the same category. For the purpose of this article, an artificial structure is regarded as any man-made construction which is fixed to the bottom of the sea or floats permanently at a given spot for the duration of the activity for which it is designed.

The law of the sea is facing a conflict between the traditional rules of navigation and the new norms of the settlement. While international law confers on states sovereign rights over their continental shelves for the purpose of exploring and exploiting their natural resources and, as a consequence, the right to erect permanent structures to do so,<sup>2</sup> it fails to resolve clearly the practical issues of conflict that inevitably arise. The Third United Nations Conference on the Law of the Sea, by granting a state rights to establish any artificial installation for economic or scientific purposes on its 200-mile economic zone shows a tendency to legalize the increasing use of fixed structures, but does not go beyond the broad principle that they must not result in any unjustifiable interference with the other uses.<sup>3</sup>

If the freedom of the seas is expressed nowadays through the variety of their uses, it is clear that these uses can survive only as regulated freedoms to ensure the safety of the presence at sea as well as an equal share of its wealth. In that respect, the spaces created by men – territorial sea, continental shelf, economic zones or high seas – lose a lot of their meaning and the sea must be looked on as a geographic and natural entity to be considered as a whole where interactions among users are frequent.

The construction of artificial structures should then take place in an orderly and well thought out way to harmonize with other uses of the sea, such as navigation, fishing, the laying of submarine pipelines and cables, or tourism. In view of this, it is certainly necessary not only to consider international rules concerning the construction and use of the structures but also the establishment of a basis for ocean management systems to ensure the most rational development of resources and to minimize potential conflicts.

### **Impact of artificial structures on marine activities**

The ever-growing construction of artificial structures at sea threatens a serious impact on different marine activities. This impact will sometimes result from the stationary position of the installations in a space used mainly by mobile crafts, and sometimes from the activity for which they are intended. However, this simple generalization must be tempered by the fact that the great majority of conflicts are likely to be concentrated in zones where there is intensive activity.

#### *Stationary position of artificial structures*

The first impact artificial structures will have on marine activities arises from their stationary position in a space used by vessels. The right of movement and the right of establishment will clash in some areas.

*Navigation.* Navigation and the establishment of artificial structures may conflict because of the overall growth of both activities. As a result, the frequency and statistical probability of conflicts will greatly increase.

However, in view of the vastness of ocean space, these conflicts will take place only in certain areas. Because of the location of most mineral resources or the practical need to be near the coasts,<sup>4</sup> artificial structures will normally be located within a hundred miles of the coast, an area where the concentration of vessel traffic is also greatest. As a matter of fact, statistics prove that the frequency of navigational collisions or incidents increases logarithmically with the proximity to shore.

These accidents occur primarily at 'choke points' of navigation (ie harbour approaches or international straits). If an artificial structure is located within one of these points, the probability of collision is greatly increased. Such a situation exists in the Gulf of Mexico where hundreds of offshore oil rigs, platforms and barges, as well as one deepwater port, impede navigation. A conflict is known to have broken out when the shipping industry asked for a 3-mile fairway and the oil industry replied that all offshore drilling would become impossible if the fairway exceeded 2 miles. The situation was even worse in the harbour of New Orleans where the buoy signalling its entrance was hidden by a production platform.<sup>5</sup> Moreover, the subsurface extensions of structures such as transmission cables and mooring systems present an additional danger to

<sup>4</sup>Offshore power stations and factories or deep draft harbours, for example, need to be located near the shore to facilitate the supply of coastal areas.

<sup>5</sup>A. Wenger, *Petrole et gaz naturel en Mer du Nord*, Editions Techniques, Paris, 1971, p 200.

navigation, especially with regard to submarine traffic and the anchoring of tankers.

On the high seas, the conflict will be much less acute in view of the small number of permanent structures being used and of the much wider manoeuvring room. Only structures intended for the exploitation of manganese nodules are likely in the future to interfere with navigation on international routes.

International law has so far remained too imprecise to solve effectively the practical conflicts that may arise between the two activities. Article 15/1 of the Geneva Convention on the Territorial Sea, 1958, gives little indication, except that 'the coastal State must not hamper innocent passage through the territorial sea'. Despite its generality, it must be noticed that this article emphasizes the fact that the use of such waters must be consistent with navigation and does not give full power to the coastal state, even in this area of territorial sovereignty.

More interesting are the provisions concerning the continental shelf. The convention of 1958 related to it provides that 'the exploitation of the Continental Shelf and the exploitation of its natural resources must not result in any unjustifiable interference with navigation . . .' (Article 5/1) and specifies that 'neither the installations or devices, nor the safety zone around them, may be established where interference may be caused to the use of recognized sea lanes essential to international navigation' (Article 5/6). This vague statement was criticized as soon as the International Law Commission (ILC) adopted it in 1953 preparatory to the First Conference on the Law of the Sea. But the Commission justified its position by saying that the purpose was not to establish a hierarchy of rights and priorities, but rather to find a balance between new and traditional uses. This balance had to be determined by the relative importance of the interests involved.<sup>6</sup> The ILC did not try to limit the very subjective character of the unjustifiable interference and preferred to leave it flexible. Had it set down that the exploration and exploitation of the continental shelf should never interfere with navigation, the sovereign rights of the resources of the shelf as well as the purpose of the adopted rules would have been nothing more than theoretical. Likewise, the 'recognized sea lanes essential to international navigation' are not clearly defined and it will be a question of assessment to decide whether or not a sea lane is essential to navigation.

The drawback of these texts is clearly that they make the coastal state the one and only judge of what constitutes an unjustifiable interference off its coasts. The Third UN Conference on the Law of the Sea has not brought any tangible modification to these articles.<sup>7</sup> Only Article 147, which concerns the exploitation of the International Area to be placed under the control of the Authority, is precise in providing that the structures 'shall not be located in the Area where they may obstruct passage through sea lanes of vital importance for international shipping. . .' and that 'the location of safety zones shall not be such as to form a belt impeding the lawful access of shipping to particular maritime zones or navigation along international sea lanes. . .'. Only international shipping on major maritime routes has then priority over artificial structures, which leaves the future Authority with great freedom to decide on their emplacement. Confirmation is given in Paragraph 3 of the same article, stating that 'other activities in the marine environment shall be conducted with reasonable regard for activities in the Area'. This suggests that, except in the situation provided for in Paragraph 2, the

<sup>6</sup>See the ILC's Commentary to draft Article 71 (now Article 5) in *ILC Yearbook*, Vol II, 1956, p 299.

<sup>7</sup>See Article 60/7 and Article 80 of the Convention on the Law of the Sea, 1982. See also Article 246/8 and 261 for the deployment of ODAS.

other users of the ocean must respect the emplacement of artificial installations rather than the contrary.

Clearly an international body can hardly give more than general guidelines in such matters; to allow adaptability to local circumstances. However, some areas of heavy traffic should always be closed to the use of permanent structures when such an emplacement results in excluding navigation altogether or making it hazardous. This is the case in the vicinity of harbours, in straits, or in narrow channels.

It must be said that very often agreements will be met for the reason that oil companies and shipowners have a common interest in setting fairways and avoiding conflicts. Moreover, oil companies themselves usually own important fleets. More than any government pressure, self-interest is a good motivation for an agreement.

*Fishing.* The establishment of artificial structures may also interfere with the fishing industry, as it hinders the passage of fishing vessels and results in loss of access to fishing grounds. Moreover, as will be seen in the next section, the installations related to the oil industry present serious pollution hazards.

The conflict will once again take place in the coastal zones. About 93% of the world catch occurs within 200 miles of coastlines, a distance that also represents the outer limit of the exclusive economic zone. However, the impact will only be acute in areas where both intensive fishing and intensive industrial activities take place, as well as in confined areas such as enclosed seas.

A typical example is the North Sea, which is the major fishery for all the states bordering it and accounts for almost a quarter of the total world catch. At the same time, the oil reserves of the North Sea are estimated to be about 10% of the total offshore oil reserves of the world: this leads to the extensive establishment of permanent structures to explore and exploit these resources.<sup>8</sup> Thus, the conditions for conflict undoubtedly exist, and indeed about 470 square miles of the North Sea are effectively closed to fishermen, resulting in a loss of 3% of the catch for each vessel fishing in this area.<sup>9</sup> Moreover, it must be considered that the grouping of several installations and related devices for one given field may effectively close off a much larger area of sea since no trawler would risk fishing between them.

This brings us to another aspect of the impact of artificial structures on the fishing industry: the underwater equipment which is often a necessary part of the installations. Since a sizeable part of the fishing fleet in the North Sea is engaged in bottom trawling, there is a risk of trawl-boards coming into contact with underwater equipment and damaging it. The suspended well-heads, for example, which are used while the economic viability of an oil find is appraised, are subsurface devices only marked by buoys. The risk is double: the buoys themselves can cause damage to the fishing gear if the buoy breaks loose and the unmarked well-head can damage or be damaged by the trawl-board. The same kind of risk exists in relation to pipelines, since a trawl-board or an anchor hitting a pipeline may result in damage to the fishing gear and a possible spill of oil from a ruptured pipeline. Although these pipelines are usually well buried in the seabed, some may be suspended between areas of higher ground or be uncovered as a result of tidal movements. Prudence would then lead a trawler captain to fish well away from the pipelines marked on his charts.

The protection of the fishing industry by recent international law is

<sup>8</sup>Study of the Scottish Council, 'World offshore oil and gas: a review of offshore activity and assessment of worldwide market prospects for offshore exploration/production equipment and material', *Petroleum Economist*, February 1976.

<sup>9</sup>See J.P. Grant, 'The conflict between the fishing and the oil industries in the North Sea: a case study', *Ocean Management*, Vol 4, 1978, pp 137-149.

very limited. Where the Geneva Convention on the Continental Shelf provided that the construction of artificial structures should not result in any unjustifiable interference with fishing,<sup>10</sup> the Third Conference on the Law of the Sea has left a blank, justified by the fact that the exploitation of the living resources of the economic zone now depends on the coastal state.<sup>11</sup> As a consequence, it is the coastal state that will set the priority between the establishment of artificial structures and the fishing industry in view of its own needs. However, the pressure of fishermen on the national level as well as traditional fishing agreements with other countries will in most cases lead the coastal state to seek a balanced resolution of the conflict.

In the International Area, fishing should be protected by Article 147/2(ii), which provides that stationary and mobile installations 'shall not be located . . . in areas of intense fishing activity'. As for navigation, this activity should nevertheless be conducted with reasonable regard for activities in the Area (Article 147/3).

*Laying of cables and pipelines.* Although less important, the impact of artificial structures on the laying of submarine cables and pipelines must be mentioned. Where an oil field is being exploited, where a large bottom-bearing installation is established, no cable or pipeline can be laid. If these already exist, they will have to be displaced to avoid the location where the exploration or the exploitation of an oil field is planned to take place.

The rules reflected in Article 4 of the Geneva Convention on the Continental Shelf clearly forbid the coastal state to remove summarily a pre-existing cable on its continental shelf in order to establish artificial structures. Nor may the coastal state impose a blanket prohibition on new cables laid by third states on account of the fact that they could possibly, one day, hinder the exploitation of the shelf. However, it appears that the coastal state could impose conditions concerning the route to be followed to avoid designated areas of exploitation activities and require certain construction standards, minimum depths and so on, provided they were reasonable and non-discriminatory.<sup>12</sup> If the pipeline or the cable already exists, it seems reasonable to state that the relocation should be carried out against compensation for the expense involved. If it is a new one, consultations between the coastal state and the owner may be expected, but what already seemed probable in 1958 was confirmed by UNCLOS III: the delineation of the course for laying such cables or pipelines on the continental shelf will be subject to the consent of the coastal state (Article 79/3).

*Dredging.* The seabed contains a variety of mineral resources other than oil ranging from beach sand and gravel through heavy minerals associated with beach deposits to surface deposits of manganese and phosphorite. Leaving aside these surface deposits, all others require dredging for their exploitation. Localized only in coastal areas, this activity is totally incompatible with the establishment of artificial structures. Dredging of the seabed can lead to erosion of the floor near the structure, causing it to collapse if it rests on piles. If the structure is floating it may damage the subsurface equipment linked with it.

#### *Activities carried out on artificial structures*

It is clear that some artificial structures will be used for activities which

<sup>10</sup>See Article 5/1.

<sup>11</sup>See Articles 56 and 58 of the Convention on the Law of the Sea.

<sup>12</sup>See the ILC's Commentary to Article 70 (now Article 4), para I in *ILC Yearbook*, Vol II, 1956, p 299; and R. Young, 'Offshore causes and problems in the North Sea', *American Journal of International Law*, Vol 59, 1965, pp 505–522, at page 521.

can have a serious impact on the other users of the sea, whereas others will be less disruptive. I will deal here with structures intended for activities which may present a pollution risk, such as those linked with the oil industry or nuclear energy.

*Fish farming and fishing.* The fishing industry is understandably concerned about the consequences on fish stocks and their food of oilspills from offshore installations. For fish farmers, the danger comes from a possible offshore blow-out which could ruin the coasts used for aquaculture if the currents and tide bring the oil ashore.

So far, pollution from offshore activities remains minor. Until 1977, it accounted for only 7.5% of total marine pollution.<sup>13</sup> It seems then that the level of oil pollution from this origin will have only a minor effect on fish stocks and a negligible effect on plankton. However, it can only increase together with the multiplication of offshore drillings, notwithstanding the fact that a major blow-out would have a great impact on the living resources of the sea. So far, twelve accidents of this kind have been registered since 1964, the quantity of oil spilled becoming increasingly significant. For example, an estimated 400 million tons of oil were spilled by the IXTOC I well in the Gulf of Mexico in 1979. Moreover, the magnitude of the risk can hardly be assessed, since it depends on several factors such as the content of the field, the time taken to plug the well or even to localize the blow-out.<sup>14</sup>

Well aware of the possible impact of offshore oil exploitation, the drafters of the Geneva Convention on the Continental Shelf prohibited any unjustifiable interference with the conservation of the living resources of the sea (Article 5/1). This broad principle, which has been repeated in several conventions on the environment since 1958, is expressed also in the Convention on the Law of the Sea of 1982: Article 193 lays down that 'States have the sovereign right to exploit their natural resources . . . in accordance with their duty to protect and preserve the marine environment'. The measures to prevent, reduce and control pollution shall deal with all sources of pollution and include 'installations and devices used in exploration or exploitation of the natural resources of the sea-bed and subsoil' as well as 'all other installations and devices operating in the marine environment' (Article 194/3 c and d).

*Recreational activities.* Recreational activities in coastal areas have increased considerably in recent years, expressing social progress registered in several countries and the growing demand for a better quality of life. As an example, an estimated 20 million people spend their annual holiday in French coastal areas.<sup>15</sup> The exact impact of tourism for a country or for an area is difficult to estimate precisely, but it is clear that recreational activities are a major source of income for many seaside resorts and create new job opportunities for their population.

Nations are becoming aware of the fact that their coastal areas need to be protected. As evidence, one can look at the growing interest states are showing in establishing marine parks and near-shore marine areas designated for recreational use under restricted and regulated conditions.

The establishment of artificial structures near such coastal areas may be disruptive, not only because the view over one of them could hardly be described as scenic, but also because of the oil from drilling rigs that washes ashore. In some areas of the Gulf of Mexico in Louisiana and Texas, coastal waters are sometimes unfit for swimming. Moreover, an

<sup>13</sup>Information from a meeting organized by the United Nations Program for the Environment in Paris, 29 March–1 April 1977, quoted in L. Lucchini and M. Voelckel, *Les Etats et la Mer*, La Documentation Française, Paris, 1978, p 215.

<sup>14</sup>See also R. Rodière and M. Remond-Gouilloud, *La Mer: Droit des Hommes ou Proie des Etats*, Pedone, Paris, 1980, p 112.

<sup>15</sup>*Rapport du Commissariat Général au Plan, Groupe Mer et Littoral, 8ème Plan*, La Documentation Française, Paris, 1981, pp 191–194.

accidental blow-out keeps tourists away from the area hit by the pollution wave, the ecological impact being thus followed by a strong economic impact. This was felt, for example, on the northwestern coast of Brittany where almost yearly accidents of supertankers (most notably the *Amoco Cadiz* in 1978) drastically diminished tourism during the following summer.

### **Accommodation with other uses of the sea**

Once the various impacts of artificial structures have been assessed, the means of accommodating these structures with the other uses of the sea must be sought. Some of these means are purely technical and concern the safety of the presence at sea, for which international and national laws have already provided several regulations – the other means relate to the adaptation of the notion of ‘reasonable use’ of the sea.<sup>16</sup> The use of artificial structures should not result in damage to ocean space and its living resources: it should be an ‘innocent’ use. To respect other uses, the establishment of permanent installations should be organized so as to balance evenly the various interests according to the natural, social and economic situations of each area. Coastal zone management programmes which are promoted in several countries now are the practical expression of the ‘reasonable use’ theory.

#### *Safety at sea*

To ensure the protection both of moving crafts and of fixed constructions, a number of rules were established, accommodating the right of movement and the right of establishment.

*Notification of construction.* The coastal state that decides to grant a permit to construct an artificial structure off its coast is bound to give notice of it. This obligation applies as much on the territorial sea where ‘the coastal State shall give appropriate publicity to any dangers to navigation, of which it has knowledge. . .’<sup>17</sup> as on the continental shelf or the exclusive economic zone where ‘due notice must be given of the construction of any installation’.<sup>18</sup> These duties ensure in the first case the right of innocent passage and in the second case the freedom of navigation.

The first question that comes to mind when reading these imprecise texts is to know when and to whom the coastal state must give this due notice.

From the debates which have preceded the drafting of the Geneva Convention on the Continental Shelf, it appears that this notice should be given before the construction of the installation. However, the coastal state is not bound to reveal its projects beforehand or to give details. It is enough for it to inform the parties concerned of its intention when it has taken the decision to authorize the construction of an installation in a specific perimeter of its continental shelf.<sup>19</sup>

As far as the parties which will have to be forewarned are concerned, the ILC had suggested that not only governments should be informed but also all organizations concerned with navigation and fishing.<sup>20</sup> In fact, practice shows that the result expected will be obtained if notice is given to the six or seven governments which regularly publish Navy Charts or Notices to Mariners.<sup>21</sup> Following this trend and although no precision is given in the articles related to the various coastal zones, the Third United

<sup>16</sup>For an extended analysis of this notion, see J.D. Wahiche, *Les Structures Artificielles en Mer – Regime Juridique*, thesis, The Sorbonne, Paris, France.

<sup>17</sup>Geneva Convention on the Territorial Sea, 1958, Article 15/2.

<sup>18</sup>Geneva Convention on the Continental Shelf, 1958, Article 5/5.

<sup>19</sup>See the ILC’s Commentary to draft Article 71 (now Article 5) in *ILC Yearbook*, Vol II, 1956, p 299.

<sup>20</sup>This proposal was rejected during the 41st Session of the Commission.

<sup>21</sup>See Wenger, *op cit*, Ref 5.

Nations Conference on the Law of the Sea has drafted an article concerning stationary and mobile artificial structures used to conduct activities in the international zone, stating that their 'erection, emplacement and removal shall be subject of timely notification through Notices to Mariners or other generally recognized means of notification'.<sup>22</sup>

This has already been put into practice in the North Sea, for example, where cooperation between the various marine services of the coastal states is very active. To speed up the proceedings, they communicate directly without passing through the governmental channels. In fact, the problem comes mainly from the slowness of exploitation and transmission of the data, in consequence of which mariners learn the exact position of the installation with a certain delay.

The second question to answer concerns the effective legal scope of these notices. Are they unilateral acts to be considered as established facts or would it be possible for third parties to oppose and maybe defeat the projects? It does not seem that such notices are meant to give the opportunity, for a certain period – which anyway would be difficult to determine – to a third party to oppose the emplacement of a structure. The notice provided by Article 5 of the Geneva Convention on the Continental Shelf must rather be considered as a safety measure – a compulsory measure certainly, but one which does not give any opposition right to third parties. Should a dispute arise, it will most likely be settled through the usual diplomatic channels.

Nevertheless, a proposal made by the Belgian government at the Deep Sea Bed Committee in 1973 must be pointed out, as it represents an entirely new approach.<sup>23</sup> This proposal was intended to safeguard the interests of other states by giving them an opportunity to participate in the decision-making process of the coastal state, and by providing recourse to an impartial body (IMCO) in the event of disagreement. This organization would have had the power to prescribe where appropriate changes and adjustments should be made as for the construction of the installation. The proposal stated further that IMCO could not prohibit altogether the construction of an installation on the territorial sea, but it remained silent on this point in the articles concerning the continental shelf. In 1973, this omission probably implied that the organization would then have this power, on account of the fact that the superjacent waters of the shelf were, at that time, still considered as high seas.

This approach has two main drawbacks. First, proceedings would be extremely slow and tedious if every emplacement of a platform or an ODAS led to consultations. Second, resort to an international organization, although sometimes desirable, would also give rise to insoluble problems. Which state could, in fact, bring an action? International law knows no *actio-popularis*;<sup>24</sup> so the plaintiff would have to prove direct and personal inconvenience, which would be possible on a regional basis but much more difficult on a world-wide scale.

Today, the rights of coastal states in the economic zone make this proposal obsolete, as these rights, which include the construction of artificial structures, are exclusive and thus could not be shared with an international organization.

*Signals and warning devices.* Like ships, artificial structures at sea must be equipped with permanent means of signalling in order to make their presence visible or audible to other users. International

<sup>22</sup>Draft Convention on the Law of the Sea, Article 147/2a.

<sup>23</sup>See UN Doc. A/AC. 138/91, 11 July 1973.

<sup>24</sup>See the opinion of the International Court of Justice on the legal situation of South-west Africa, *ICJ Reports*, 1966, p 47. For Jessup, however, the idea of an international *actio-popularis* has been expressed many times and could be used for an interpretation: *ICJ Reports*, 1962, p 425, and 1966, p 373.



recommendations concerning the signalling of offshore platforms have been set down by the Executive Committee of the International Association of Lighthouse Authorities on 28 May 1965. Most countries using artificial structures have adopted these recommendations. Thus marking and signal requirements have been harmonized, so that mariners have one set of rules to apply in all areas, whether coastal waters or high seas.

It must be pointed out that such regulations apply only to a fixed artificial structure, ie a platform secured to the seabed or submerged on to it, so that for all practical purposes it is stationary. Mobile structures that can be moved as an entity from position to position and then fixed to or submerged on to the seabed are subject to these rules only during the time they are actually secured to the seabed. When moving from one place to another, they must, like vessels, display lights and signals in accordance with the Regulations for Preventing Collisions at Sea of 1960.

The same set of rules could have been applied to ODAS, but the Intergovernmental Oceanographic Commission preferred to draft special provisions for scientific devices. Fixed ODAS must display the same signals as platforms, whereas floating ones have a special marking which distinguishes them, visually and audibly, from any other structures, buoys or vessels.<sup>25</sup>

As a rule, all structures permanently above sea level, whether fixed, temporarily bottom-bearing or floating, and whatever their use may be, must be signalled night and day. When the visibility is reduced to below two miles because of fog, mist or snow, visible signals are complemented by acoustic warning devices. In some areas, beacons can also be added to these devices.

*Safety zone.* Artificial structures must be protected against vessels passing in their vicinity. This is the aim of Articles 5/2 and 5/3 of the Geneva Convention on the Continental shelf and of Articles 60/4, 60/5 and 60/6 of the Convention on the Law of the Sea of 1982, which provide that coastal states may establish safety zones around artificial installations in which they may take appropriate measures to ensure the safety both of navigation and of the structures. These zones do not imply an appropriation of stretches of the high seas, their object being solely to avoid conflict between their users.

The Geneva Convention provided further that the safety zones 'may extend to a distance of 500 m around the installations and other devices which have been erected, measured from each point of their outer edge . . .'. This radius was first suggested in 1953 by the International Law Association because several countries had already adopted this limit for oil rigs ashore, a radius within which it was forbidden to smoke or start a fire.<sup>26</sup> A more flexible provision would have been suitable however, to take into account the nature and emplacement of the structure.

UNCLOS III considered this point, since it had to deal not only with offshore oil rigs but also with other types of structures. Thus Article 60 specifies that ' . . . such zones shall be designed to ensure that they are reasonably related to the nature and function of the artificial islands . . . ', which is all the more important since the function of some structures can be changed during the time of their existence.<sup>27</sup> If the normal radius of the safety zone is once again set at 500 m, derogations can be considered if they are authorized by international standards or recommended by appropriate international organizations (paragraph 5). Similar provisions

<sup>25</sup>See *Preparatory Conference of Governmental Experts to Formulate a Draft Convention on the Legal Status of ODAS*, UNESCO/IMCO, 31 January–11 February 1972, Paris, in Annex II.

<sup>26</sup>See François report at the ILC (*ILC Yearbook*, Vol I, 1953, Doc. A/CN.4/60).

<sup>27</sup>See A.M.J. Heijmans, 'Artificial islands and the law of nations', *Nederlands Tijdschrift voor Internationaal Recht*, Vol 2, 1974, pp 163–170.

can be found in the Draft Convention where the size of such zones 'shall take due account of the location of the ODAS and of the nature of the hazard involved'.<sup>28</sup>

Such flexibility is necessary considering the variety of uses of artificial islands. Deep draft harbours for example, will be used by giant tankers that need considerable space to manoeuvre and are, moreover, incompatible with oil rigs for safety reasons. Knight has even suggested that the coastal state should be allowed to establish a minimum safety zone of 3 miles and maximum of 10 miles around such installations, within which no other activity would be allowed.<sup>29</sup> In fact, the US Deepwater Port Act of 1974 does not provide for a safety zone of appropriate size 'in which no installations, structures or uses will be permitted that are incompatible with the operations of the Deepwater Port'.<sup>30</sup>

It seems reasonable to assume that structures supporting nuclear plants will also have a special safety zone wider than 500 m.

Most countries with continental shelf legislation have in this respect transposed the provisions of the Geneva Convention into their national legislation. Usually, all fixed installations have a safety zone. In the UK, however, the practice is to create such zones only around structures secured to the seabed and not around semi-submersible units. This practice derives from the fact that drilling units are on location for a relatively short period, thus barely justifying the slow procedure of creating a safety zone. A simplified method of creating such zones would nonetheless be advisable, especially when one considers that the anchor systems of such units can extend up to 1000 m.

Usually, no ship can enter a safety zone without the authorization of the competent minister. However, this prohibition does not concern administrative authorities when they inspect the installations, ships repairing cables and ships used in connection with the installations<sup>31</sup> – for supplies for example – although the French law reserves such a right to the Navy.<sup>32</sup> He who offends such regulations is usually liable to heavy fines and even imprisonment, except in the case of *force majeure* or to save human lives or goods.

*Removal of disused structures.* Article 5/5 of the Geneva Convention on the Continental Shelf provides that 'any installations which are abandoned or disused must be completely removed'. This obligation is self-explanatory. Idle structures and wrecks can be of great danger to vessels, especially if their signals are no longer functioning. Moreover, there is no reason to crowd the sea with disused installations.

The Third Conference on the Law of the Sea adopted in 1982 a more detailed text which is a line of conduct for the removal of such structures. The removal must have due regard to fishing, the protection of the marine environment, and the rights and duties of other states, and publicity must be given to the depth, position and dimensions of any installations not entirely removed. In most countries, the minister who controls the use of an offshore oil rig, for example, is also competent for its removal and the obturation of the well. Considering this obligation, it seems that in case of an accident due to an abandoned structure, the coastal state which gave the permit to establish the structure could see its responsibility involved. Its inaction could make it responsible for negligence and insufficient control.

However, most legislation has taken the necessary steps to meet this obligation in shifting it onto the owner or the operator of the installation.

<sup>28</sup>*Op cit*, Ref 25, Article 12/1.

<sup>29</sup>G. Knight, 'Deep draft harbor facilities', *Journal of Maritime Law and Commerce*, Vol 4, 1973, p 396.

<sup>30</sup>Deepwater Port Act of 1974, 3 January 1975, Public Law 93-627, 93rd Congress HR 10701, 33 USC 1509 (d) (1).

<sup>31</sup>See, for example, the UK Continental Shelf Act of 1968, sect II, the Australian Petroleum (Submerged Lands) Act of 1967, the Soviet Decree of 6 February 1968 (*On the Continental Shelf of the USSR*), Article 5.

<sup>32</sup>'Loi no 68-1181 relative à l'exploration du plateau continental et à l'exploitation de ses ressources naturelles, Décembre 30, 1968, Articles 4 and 33', *Journal Officiel de la République Française*, 31 December 1968.

The French law of 30 December 1968, concerning the exploration and exploitation of the continental shelf, provides in its Article 4 that the owner or operator of an offshore oil rig is bound 'to remove completely any installation or device which has ceased to be used'; the failure to comply with this provision can lead to an automatic procedure at the costs and risks of the owner or operator. Moreover, the administration has 'the possibility to pursue the reparation of the wrong committed to the public property according to the procedure of public thoroughfares contraventions'.<sup>33</sup> As for other artificial structures, they are usually covered by the laws on the economic zone.

It should also be noted that the Preparatory Conference of Governmental Experts to formulate a Draft Convention on the Legal Status of ODAS in 1972 proposed the same kind of provision. The owner of an ODAS is required to remove it when it is disused; should he fail to do so, the state or authority providing the aids of navigation in the area may remove the device and recover the cost from the owner.<sup>34</sup>

#### *Reasonable use of ocean space*

The extended rights of coastal states over large stretches of sea are balanced by their duty to protect the environment and respect the various interests in the marine areas over which they exercise sovereign rights.

*Innocent use of the sea.* In the long term, the impact on the environment may become the biggest legal obstacle to artificial structures, especially those linked with the oil industry, such as drilling rigs or offshore terminals. This impact must be reduced as much as possible by means of preventive measures.

In an open and fluid environment, pollution becomes a risk which may be difficult to assess, as the substance spilled can be spread over hundreds of miles. This has two consequences. First, the victims of the accident will usually be third parties, like fishermen, oyster farmers or seaside resorts which are unable to forecast the disaster and its extent. Second, the country which is most hit by the pollution will not necessarily be the one on whose continental shelf the accident had its origin.

Marine pollution has then international and national aspects which will be reflected in the measures taken to prevent it. The international provisions contained in conventions and treaties set a certain number of conventional rules which, by their number and their repetition, now form a general obligation to prevent pollution and create a framework for the measures to be taken at the national level.

Without going into details of regulations which have been analysed at length elsewhere, suffice to say that beyond the general obligation to protect the ocean environment and its living resources from harmful agents<sup>35</sup> two sets of rules must be considered. The first deals with the construction and emplacement of the structures, and the second with the development of the operations.

Regulations for the construction of artificial structures are not generalized as yet, but it should be emphasized that the Convention on the Law of the Sea of 1982 provides that states shall regulate 'the design, construction, equipment, operation and manning of such installations and devices' (Article 194/3 c and d). Since no international uniformity can be obtained because of the diversity of the emplacements and types of structures as well as the development of modern technologies, rules must be made common to certain types of installations in determined areas. As

<sup>33</sup>*ibid*, Article 4; and M. Remond-Gouilloud, 'La protection de la mer contre les épaves de navires', *Revue Juridique de l'Environnement*, Vol 2, 1979, p 95.

<sup>34</sup>Articles 12/3 and 4.

<sup>35</sup>Geneva Convention on the Continental Shelf, 1958, Article 5/7 and Convention on the Law of the Sea, 1982, Article 192.

a means of control, independent classification companies, such as the UK Lloyd's Register of Shipping in 1972 and the Norwegian Group 'Norske Veritas' in 1973, have elaborated rules for the construction and classification of mobile offshore units. In the USA, the American Petroleum Institute Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms has the same role. The UK, Norway, Canada and the USA have made inspection by such companies an obligation.

More widespread, however, is the control of the working plan presented by the company that undertakes the operation. To the basic texts concerning the rules to be followed in order to obtain a mining authorization, more precise regulations have been added in recent years after several accidents proved the need for a stricter control. Such plans must show the special care taken by the operator to avoid the risks of damage to the marine environment and the measures that will be taken to ensure the safety of the operation.<sup>36</sup> In the USA, 23 blow-outs before 1969, among which the Santa Barbara accident can be considered a major one, emphasized the need for local control in addition to the federal control provided for in the Outer Continental Shelf Lands Act, the Submerged Lands Act and the Oil Pollution Act. Thus, according to the Water Quality Improvement Act of 1970,<sup>37</sup> certificates must now be obtained not only at the federal level, but also from a control Agency of the adjacent coastal state, better suited to assess local conditions of offshore drillings.

In addition to such measures, rules concerning the safety of the development of mining operations have been made, some at a national level and some only at an international level. This could show a tendency towards future regulations.

'Good oilfield practice' is a common notion in English texts. Despite the fact that it represents an obligation of means rather than of result, such rules have the advantage of imposing an unlimited obligation on the oil companies. Since no precedents define exactly what level of care must be taken, the only reference is the Institute of Petroleum's Code of Practice which simply provides that no oil should be spilled in the sea. Usually, however, national mineral working acts specify some safety technique which may be used.<sup>38</sup>

Less advanced are the rules concerning operational wastes, ie material evacuated during normal operations. International regulations dealing with this aspect of pollution relate mainly to rejects from vessels and only incidentally to those from offshore structures. However, the London Convention of 2 November 1973, on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters, concerns floating devices and fixed or floating platforms and covers all kinds of rejects, dumping or spills, although not the spills directly resulting from the operation itself. Only the Helsinki Convention of 22 March 1974, on the Protection of the Baltic Sea, has wider scope. It sets a maximum percentage of waste caused by the operation itself, and prohibits altogether any dumping from the platform or accompanying vessels within the safety zone. Only dumping of alimentary wastes is permitted if they have passed through a grinding mill and if the platform is situated further than 12 miles offshore. Usually, national legislations also set a limit on dumping from platforms, although some, like the French law, are too strict to be really respected. Such regulations are intended nonetheless to protect marine life and reduce the conflict with the fishing industry.

<sup>36</sup>See, for example, the UK Petroleum (Production) Regulations of 1976 and the Norwegian Royal Decrees of 25 June 1976 and 9 July 1976.

<sup>37</sup>Public Law No 91-224, Title 1 (3 April 1970), 84 Stat 91. See also R. Krueger, 'International and national regulation of pollution from offshore oil production', *San Diego Law Review*, Vol 7, 1970, pp 541 ff.

<sup>38</sup>See, for example, the UK Mineral Workings (Offshore Installations) Act of 1971, Reg 16.

Most conventions for the prevention of marine pollution provide for continuous supervision of the structures, especially if they present a serious risk.<sup>39</sup> The Convention on the Law of the Sea of 1982 imposes also a general obligation for coastal states to 'individually or collectively through the competent international organizations . . . observe, measure, evaluate and analyse . . . the risks and effects of pollution on the marine environment' (Article 204). The necessity of such inspections was clearly shown in 1970 after an unmanned Chevron Oil platform was destroyed by a blow-out and the wells erupted, spilling oil for several weeks in the Gulf of Mexico.

When the subsequent investigation on the accident revealed that several safety rules had been violated by the company operating the platform, it became obvious that frequent inspections were necessary to control and ensure the respect of the safety regulations.<sup>40</sup>

The last prevention measure against pollution is the plugging of the well when it is abandoned, a measure which is usually subject to strict control by the administration.

### *Management of coastal zones*

The policy to be implemented for the management of coastal zones is necessarily multiform. This policy must not only express the delicate balance between the development of the economic potential of an area and the concern for its protection, but also define it in a relevant way at the local and regional levels to take into account the diversity of situations and the various natural or human factors which differ so much from one area to another. Considering this, we will try to emphasize the main directions and the priorities of such a programme to create a framework for the accommodation of artificial structures with the other uses of the sea.<sup>41</sup>

A study made by the UN in 1972 can be used here as a starting point, since it indicates a pragmatic approach backed up by a general scheme of analysis and classification or general guidelines for the integrated management of marine areas. The procedure should comprise:

- A definition of the area to be managed and a statement of all existing data (maps, statistics, etc. . .).
- A collection of the data and a determination of the studies still to be made.
- An inventory of the existing resources in every field and an assessment of the uses of the area.
- The establishment of an administrative structure and the formation of a staff to ensure its permanency.<sup>42</sup>
- An identification of the needs and the connection between planning goals and existing potential.
- The final establishment of the areas to be managed considering the information gathered and the main goals.
- A study of the existing institutional structures and the administrative and legal framework to be developed.
- The establishment of a general development framework and management of the area.
- The creation of the administrative structure necessary for the implementation of the project and the securing of the funds by appropriate organizations or bodies.
- The establishment of a supervision and control process for the project.

<sup>39</sup>See the Convention for the Protection of the Mediterranean, Barcelona 1976, the Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircrafts, Oslo, 1972, and the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters, London, 1972.

<sup>40</sup>On this accident, see *Oil and Gas Journal*, 16 February 1970, p 43; 23 February, p 65; 2 March, p 41; 16 March, p 97; and 6 April, p 78.

<sup>41</sup>See on this problem, E.D. Brown, *The Legal Regime of Hydrospace*, Stevens, London, 1971, pp 90-96; and R. Young, 'Offshore claims and problems in the North Sea', *American Journal of International Law*, Vol 59, 1965, pp 505-522.

<sup>42</sup>UN Document E. 5120, *Uses of the Sea*, 21 May 1972.

Coastal zones are usually defined as including coastal waters and the lands thereunder to the outer limit of the territorial sea, and islands from the shorelines to the extent necessary to control shorelands with a direct and significant impact on coastal waters.<sup>43</sup> They are the area where earth and water, land and sea, come into contact and where the solutions for their management tend to mingle. For the purpose of this analysis however, we will also consider the establishment of installations on the continental shelf and the economic zone, as the stationary position of the structures makes them offshore dependencies of the coastal states.

The establishment of a general development programme is one of the main aspects of the UN study. To set it up, the significance of every activity for the coastal community will have to be considered and the relative benefits will have to be assessed. Thus, the construction and use of artificial structures will be placed within the scope of such programmes.

Some countries, such as the USA and France, have already started to set up such management programmes as well as the administrative framework necessary to their implementation.

In the USA, the Coastal Zone Management Act<sup>44</sup> was passed in 1972 for the purpose of encouraging coastal states to exercise full authority over the lands and waters of their coastal zones. These states are encouraged to participate by a two-step funding programme administered by the Secretary of Commerce, who has delegated his authority under the act to the Administrator of the National Oceanic and Atmospheric Administration (NOAA). The Administrator may grant funds to promote the development of a state coastal zone management programme and then, after reviewing and approving the programme, may award additional funds to assist the state in operating this programme. An approved programme must control the development and solve conflicts among competing uses. In this way, different local authorities can also combine their efforts to achieve a national management programme for coastal areas. Funds are then granted at national level when programmes are approved.

This kind of organization can also be found in the French system, where local administrations are controlled by central government. The proposals made at the higher level are implemented by the local administrations. The 'Conservatoire du Littoral' has, together with the local representatives, a policy similar to that adopted in the USA. Its mission is ecological and economic. To the safeguarding of the natural sites is added the reorientation of maritime areas.<sup>45</sup>

The protection and management of the coastal areas in relation to artificial structures could be 'hard' or 'soft'. A 'hard' management policy would mean that artificial structures would not be used at all, either because of environmental considerations or because their use would exclude other necessary uses. This would be the case near estuaries and wetlands, where biological renewal and regulation of the natural balance take place. It would also be the case near protected natural sites and beaches used extensively for recreational activities in areas dependent on tourism. As an example, the US Deepwater Port Act of 1974 accounts for environmental interests in the establishment of this kind of artificial structure and a project can be defeated at federal and state levels. The Administrator for the Environmental Protection Agency can oppose the construction of a port if it is not consistent with the Clean Air Act, the Federal Water Pollution Control Act Amendments of 1972, or with the Marine Protection Research and Sanctuaries Act.<sup>46</sup> Moreover, at the

<sup>43</sup>Definition of the US Coastal Zone Management Act of 27 October 1972, Public Law 92-583, Sept 304 (a).

<sup>44</sup>This Act appears as an amendment of the Marine Resources and Engineering Development Act of 17 June 1966 (80 Stat 203) as amended (33 USC 1101-1124).

<sup>45</sup>See Rapport du Groupe de Travail du Commissariat General au Plan, *Mer et Littoral*, La Documentation Française, Paris, 1980.

<sup>46</sup>See Deepwater Port Act of 1974, 33 USC 1505.

state level, the governor of the adjacent coastal state can veto the establishment of a port if its impact on the marine area or the coast would be harmful. In fact, the state of New Jersey rejected in 1973 as 'unacceptable' a proposal to build terminals off its coast. State officials concluded that the 'environmental and social implications outweighed the benefits' in view of potential oil spills which could prove disastrous to the wetlands of this state.<sup>47</sup> The establishment of artificial structures could also exclude or hinder other useful uses in some busy areas, like harbours or narrow straits. In such areas, it seems that it would be necessary to adopt a clear priority rule in favour of the activities which are necessarily sea-based. As a result, artificial structures established to serve traditionally land-based and land-oriented activities – floating factories or offshore airports for example – would have lower priority than sea-based activities.<sup>48</sup>

A 'soft' policy would mean that the establishment of artificial structures would accompany other activities provided that some measures were taken to accommodate them. As far as environmental protection is concerned, impact studies would be necessary to assess the effects of artificial structures. Land management plans could be extended offshore through collaboration between oceanographic research and the authorities responsible for the management plans. This would make possible the determination of the more sensitive zones, the process being followed by the establishment of an aptitude scheme for the use of the sea.<sup>49</sup> The control of the impact studies would rest with local administrations in association with scientific organizations.

In areas used also for navigation, the accommodation would include the establishment of fairways and channels in order to avoid dangers of collision. The establishment of such routes should take place with the cooperation of IMO and the coastal state concerned, which would set the routes, their width and the aids to navigation.<sup>50</sup>

Finally, the impact of the construction of artificial structures on the coastal community will also have to be assessed. The Coastal Zone Management Act emphasizes some elements which should be considered in this respect: procedures to be taken for preserving or restoring areas of recreational, ecological, or aesthetic value;<sup>51</sup> '... a method of assuring that local land and water use regulations within the coastal zone do not unreasonably restrict or exclude land and water uses of regional benefit';<sup>52</sup> and 'adequate consideration of the national interest involved in siting of facilities necessary to meet requirements which are other than local in nature'.<sup>53</sup>

It is clear that choices will often have to be made in light of the particular context of the establishment of an installation. In some areas the construction of artificial structures could be beneficial to the coastal population as it would create new jobs. The example of deepwater ports is interesting: in the Gulf of Mexico (the LOOP) or in France (Fos, Antifer). Other types of structures have the same result (floating factories, drilling rigs). Moreover, the benefits of oil exploitation at the national as well as regional level do not need elaboration.

On the other hand, the establishment of industrial artificial structures off the shores of a traditionally fishing-oriented area can be very disruptive. In Scotland, the advantage of the exploitation of offshore oil has to be balanced against the loss of access to fishing grounds for fishermen. As a means of accommodation, the fishing industry asked the government to compensate for the loss, since the government enjoys a

<sup>47</sup>Cited in Papadakis, *The International Legal Regime of Artificial Islands*, Sijthoff, Leyden, 1977, p 27.

<sup>48</sup>This opinion was expressed by W. Riphagen in 'International legal aspects of artificial islands', *International Relations*, Vol IV, No 4, 1973, pp 327–347, at p 333.

<sup>49</sup>See *op cit*, Ref 45, pp 215–240.

<sup>50</sup>See, for example, IMCO Documents MSC XXVIII/22, 26 September 1973, Annex IV; NAV XVI/2 (a)/1–4, January – March 1974; NAV XVI/WP7, 2 April 1974; and IX Res 340, 18 December 1975.

<sup>51</sup>*Op cit*, Ref 43, 16 USC 1455 (c) (9).

<sup>52</sup>*Ibid*, 1455 (e) (2).

<sup>53</sup>*Ibid*, 1455 (c) (8).

substantial source of income from offshore operations by granting licences.<sup>54</sup> In other areas, the traditional fishing activities must be preserved to take into account important sociological considerations.

Once again, the Deepwater Port Act can be taken as an example of effective control for this kind of impact. The licence for the construction of the port can be granted only if it is in the national interest and consistent with the national policy goals and objectives, including environmental quality. The coastal state which decides to be linked with it must plan a coastal zone management programme as stated in the Coastal Zone Management Act.<sup>55</sup>

This regulation is remarkable in so far as the share given to the studies preceding the establishment of the port is quite important. It also has the advantage of making prevention and management efforts necessary, not only on the part of the owner or operator of the installations, but also on the part of the state which will draw benefits from it. The system is then complete: the port will fulfil the technical safety rules, and the environment in which it is located will have been developed accordingly.<sup>56</sup>

In this respect, the 'aptitude and management schemes' as they exist in France also constitute an interesting initiative: they are, in a way, an offshore extension of land and town planning onshore. The development of such programmes should certainly be generalized in the near future, and could take place on a regional scale (the North Sea or the Baltic Sea, for example). The priorities given to various users of the sea would then depend on local needs and conditions, while a clear priority would be set for the protection of the environment.

## Conclusions

The impact of artificial structures on traditional marine activities will certainly constitute a growing problem in the years ahead. In view of this, it will be necessary to achieve a harmonization of the rules concerning safety at sea as well as the establishment of a basis for ocean management systems which would ensure the most rational development of resources and minimize potential conflicts.

Whereas the coordination of safety rules could be achieved at international level through the action of organizations such as IMO or the IOC, which has already started to harmonize rules concerning oceanographic installations, international law has little to offer to the solution of conflicting uses beyond the general concepts of reasonableness and equity. However, a framework could be set up to be used at national and regional levels for the establishment of management systems in sensitive areas. Then, when interests are evenly balanced, 'the question will be to make a value judgement on the basis of the best available economic and social data'<sup>57</sup> to set priorities between artificial structures, navigation, fisheries or conservation interests at the time of the construction of the installations. It is clear that this rational approach will require information processing, analysis and planning on a broad interdisciplinary basis.

The solutions concerning the use of artificial structures will thus fit into the general evolution of the law of the sea, which tends towards rational management of the oceans. Awareness of their economic significance and of the need to achieve optimum usage of their resources should lead to management policies that act not only in the interests of coastal states, but also in the common interests of all users. This will lead to the institutionalization of an international administration of ocean space.

<sup>54</sup>See Grant, *op cit*, Ref 9, p 142. The United Kingdom Offshore Operators' 'Association', prompted by the Fisheries and Offshore Oil Consultative Group, established in July 1975 a voluntary compensation fund to be administered by the three fishermen's federations, but this covers only the damages and loss of fishing time caused by debris from offshore operations.

<sup>55</sup>Act of 3 January 1974, 33 USC 1508. However, continued development and eventual approval of the programme are not required. See also R.G. Hildreth, 'The Coastal Zone Management Act', *San Diego Law Review*, Vol 13, 1976, pp 253-305.

<sup>56</sup>As early as 1974, 28 states has already started to set up such programmes.

<sup>57</sup>E.D. Brown, *op cit*, Ref 41, p 96.