Section 3 Present State of Navigational Safety and Casualty Preventive Organization within Tokyo Bay, and Counter Measures

3.1 Marine Traffic Environments.

3.1.1 State of Ship Traffic.

Tokyo Bay is flanked by our country's political, economical and cultural center, the capitol Municipality of Tokyo in the middle, and the very large consumer and living areas of Yokohama, Kawasaki, Chiba, and other cities in the background. Along its shorelines are the key industries, the steelmaking, petroleum, electric power, gas, shipbuilding, etc., their related industries and establishments, forming a large coastline industrial zone. To satisfy the needs of these industries and provide the necessary raw materials for their consumption, as well as, the transportation for the products, marine transportation is extremely active, with the specially designated harbours of Tokyo Bay, the Keihin (Yokohama, Kawasaki and Tokyo), Chiba, Yokosuka, and Kisarazu harbours constituting the shipping bases.

(1) At the various harbours within the Bay, there are heavy movements of work boats, the sand and earth transporters (pusher barges) etc., on account of the harbour facilities constructions and land reclamations being carried out under long term programs. While, on the other hand, 15 car ferries owned by 8 firms, with bases in Tokyo and Kawasaki, are serving the Bay areas. These slow and fast vessels, and furthermore, the large tankers and small coastal tankers, etc., which ply between the harbours of the Bay, are moving in a confluence of large and small vessels of varied outputs and performances.

(2) Furthermore, the fishing vessels and crafts which make Tokyo Bay their principal fishing grounds, number 6,399 vessels, and when those fishing outside the entrance of Tokyo Bay, are also added, the total would reach 13,177 vessels, The fishing is going on throughout the year in various areas of the Bay, of the fishes as are found from season to season. The fishing crafts with fishing centered in and around the areas of No. 2 and No. 3 'Kaiho' (offshore gun battery embankments) of the Uraga Suido Traffic Route, which are important strategic points in the marine traffic thoroughfare, are found to be most numerous in the fall to winter period covering the months of October to December, with the number reaching 347 boats on a most numerous day. The crafts are mostly trolling boats, followed by line fishers, purse net fishers, and drag net fishers. (According to 1973 Investigations by MSA Third Regional Headquarters).

State of Ship Traffic Within Uraga Suido.

Any ship entering or departing from Tokyo Bay invariably pass through the Uraga Suido. For this reason, ships passing though this channel number as many as 1,000 ships or so in a day. According to the investigations by Maritime Safety Agency, carried out in August of 1974, ships passing in the northward and southward directions, averaged about 794 ships per day, and those crossing in the eastward and westward directions, numbered 67 vessels, a total 861 vessels in traffic volume. Ships pass at a rate of one ship per every 1½ minute during the morning and evening peak hours.

When the traffic of these ships is analyzed, it is found that small size cargo ships of under 500 gross tons, and tankers, number 421 vessels and occupy about a half of the total. However, the tankers which participate in the transportation to the petroleum related industries within the Bay that handle one-third of our country's crude oil handling volume, account for 20% of the total, and of the total number of tankers entering ports throughout Japan, especially the huge tankers exceeding 100,000 gross tons, 40% enter into Tokyo Bay.

Organization of Marine Traffic Environments.

Basing on the mass volume of cargoes being handled at all of the ports and harbours within Tokyo Bay and its ratio to the flow within Tokyo Bay, the traffic volume at the entrance to Tokyo Bay would approximately double that of today in 1985, with 1,016 ships passing though per day in one direction only. The ships under 500 gross tons in size will continue to occupy a half of the volume, but, on the other hand, ships of 10,000 gross tons or over in sizes, will also increase proportionately. These assumptions also show that the ships flowing within the Bay, mainly of sizes under 500 gross tons, would increase to 1,758 vessels by 1985. (From Ministry of Transportation, Harbour Bureau No.2, Statistics for 1973)

To ensure the safety of navigation through regulation of such large traffic volume of ships and crafts of all types and descriptions, would necessitate the organizing of the traffic environments.

The Maritime Traffic Safety Law was enacted in July, 1973, and the organization in the legal aspects was established. However, the removal of sunken vessel, dredging, etc., in the Naka-no-Se Traffic Route, through part of which deep draughted ships cannot pass, and other improvements to the traffic routes are still to be carried out. Furthermore, the study and the establishment of maritime safety system for the whole of Tokyo Bay, including the traffic routing system and control system, are also to be desired.

Further, it is desirable that a radar reflector be installed on the Naka-no-Se lighted buoy D, amongst the presently installed traffic route marker buoys, to increase its functional merit in that it constitutes an important target mark, being located in the center of the Bay.

3.2 Navigational Safety Measures.

3.2.1 Maritime Traffic Safety Law.

Further to the compliance with the laws and regulations as stipulated in the Law for Preventing Collisions at Sea, the Maritime Traffic Safety Law, Harbour Regulations Law, etc., the vessel coming under this investigation being a huge vessel with a length exceeding 200 metres, and being a LNG carrier exceeding 25,000 gross tons in size, it is subjected to special control under the Maritime Traffic Safety Law as follows, and furthermore, special safety measures has been strongly requested in the consideration of the measures for the safety of navigation within Tokyo Bay.

(1) The Bay areas within Tokyo Bay which are subjected to Maritime Traffic Safety Law, lie in the Bay area north of the line joining Kenzaki of Miura Peninsula and Sunosaki of Boso Peninsula, excepting partly, port and harbour areas, etc.

As traffic routes, the Uraga Suido Traffic Route and Naka-no-Se Traffic Route are established. As the vessels exceed 50 metres in length, and the destination being Chiba Harbour, the vessels are compelled to navigate within the two traffic routes, and first of all, to observe the general traffic rules when inside the traffic routes, the principal ones of which concerning the vessels, are as follows.

(a) The vessels are to travel within the Uraga Suido Traffic Route at a speed of 12 knots or less.

(b) The vessels in this traffic route are to navigate on the right or starboard side of the centre line of the traffic route.

(c) The Naka-no-Se Traffic Route is a one-way route for northbound traffic.

(d) When entering or leaving the traffic routes, a vessel must avoid the course of the vessel navigating inside the traffic route.

(e) Vessels are prohibited from anchoring inside of the traffic routes.

(f) Otherwise, the vessels must indicate their destinations, and when overtaking another vessel, must signal the move.

Furthermore, as the vessels are of a huge size exceeding 200 metres in length, in addition to the foregoing, as a traffic rule, it is stipulated that,

(g) Fishing vessels, etc., which sail in and out of the traffic routes or cut across the traffic routes, or vessels stopping inside of the traffic routes, are to avoid the course of the huge vessels.

(2) Being huge vessels, and moreover, carrying dangerous cargo, the Traffic Route Control Officer of the Third Regional Headquarters of Maritime Safety Agency, must be notified by noon of the day previous to the estimated date of navigation of the traffic routes, giving the following information, and instructions must be obtained.

(a) Matters to be notified.

* Name of the vessel, gross tonnage, length and draught.
* Estimated time of entering and navigating a traffic route, and estimated time of leaving same.
* Vessel's call sign or call letters.
* Destination.
* The type(s) of dangerous cargo(es) carried and the quantity(s).
* When altering the estimated time(s), the change(s) must be notified at least three (3) hours before navigating the traffic route.

(b) Matters to be instructed.

* Change(s) in the estimated time of entry and navigation in the traffic route(s).

  Vessels are prohibited from entering the traffic route after sundown until one (1) hour before sunrise.
* When navigating Uraga Suido Traffic Route, the speed shall be limited to 12 knots or less.
* Wireless/radio communication to be maintained with the Third Regional Headquarters of Maritime Safety Agency, from three (3) hours previous to the estimated time of entry into traffic route until leaving same.
* Maintaining of depth allowance.
* Employ course escort vessel equipped with fire fighting equipments to escort.
* Navigation in the traffic route to be restricted when the visibility drops below one (1) nautical mile.

Furthermore, lights and identifications are stipula-

ted in the case of huge vessels and vessels carrying dangerous cargoes.

A copy of the poster in English to encourage the observing of the Maritime Traffic Safety Law is appended to this Report as Reference No. 8.

3.2.2 Letter of Undertaking Safety Measures on Liquefied Gas Carriers.

The ship-owners or the operators of liquefied gas carriers of 25,000 gross tons or over in size, intending to have such vessels serve the ports and harbours of Tokyo Bay or other ports and harbours of our country, are required by administrative Notices to submit 'Letter of Undertaking Safety Measures on Liquefied Gas Carriers' (Note: Japanese title of the Letter is 'Ekka Gasu Sen no Anzen Kakuyaku Sho', the English translation of which is not firmly established and may read: 1) Promise of Safety Measures, 2) Letter Confirming Firm Undertaking of Safety Measures, 3) Letter Promising (Guaranteeing) Safety Measures, etc., '... on Liquefied Gas Tankers') to the Maritime Safety Office or Base concerned of the Maritime Safety Agency, for forwarding to the Director General of Maritime Safety Agency for obtaining the approval of its contents which must provide the information required, as stipulated in the MSA Notice, a translation of which is appended to this Report (Reference No. 4), which are as follows. Moreover, it is essential that every endeavour be directed to the safety of navigation by strictly observing the stated matters.

(1) The essential matters to be stated in the Letter of Undertaking Safety Measures.

(a) The Vessel's Features.

The features of the vessel's design, construction, and operation, on which extraordinary considerations were given.

(b) Chemical composition and nature of the cargo.

(c) The particulars of the vessel.

The vessel's principal dimensions, tonnages, cargo tank capacities, field of vision, propulsive and maneuvering capacities, etc.

(d) The vessel's essential equipments.

Main machineries, auxiliaries and ancillaries, navigational aids, communication equipments, fire-fighting equipments, etc.

(e) Safety Measures.

It is essential that in addition to the statement pertaining to the strict observing of the laws and regulations concerned, safety measures for the

Quote (2)

navigation of traffic routes, bay waters, narrow channels, etc., and those for navigation within ports and harbours, be also stated.

Especially, the stationing of permanent watches, reinforcing the watches by use of radars, non-overtaking of vessels of 500 gross tons or larger in size, and the taking on board of ship pilots.

(f) Assurance that boil-off gas shall not be emitted or vented to the atmosphere within Tokyo Bay, and safety measures to be employed when conducting gas purging operations.

(g) The vessel's schedule of movements (voyage schedules).

(h) The handling of emergency situations and measures, including emergency communication and liaison set-up in event of an emergency.

(2) As a result of the collision accident between the tanker YUYO MARU NO. 10 and the cargo ship PACIFIC ARES, near the north end of the Naka-no-Se Traffic Route in Tokyo Bay, which occurred on November 9th, 1974, the Third Regional Headquarters of Maritime Safety Agency have requested of those concerned, the strengthening of the safety measures for navigation as enumerated hereunder, the essentials of which are to be added into the Letter of Undertaking Safety Measures hitherto required. Information in English concerning this, is as appended to this Report, as References Nos. 9 and 10.

(a) Foreign flag vessels, and Japanese flag vessels lacking experience in entering the Bay, always shall have pilot on board.

(b) In addition to a course escort vessel equipped with the necessary firefighting capabilities, that possessing sufficient speed and navigation aiding capacities, to total two or more escort vessels, which also shall accompany the vessel even outside of the traffic route(s), shall be employed.

(c) The speed limit within the Naka-no-Se Traffic Route also shall be 12 knots or less, and the vessel shall not navigate at high speed in the other areas of the Bay as well.

(d) When navigating southward in the waters on the west side of Naka-no-Se (shoal), the vessel shall navigate at a distance of at least 1,000 metres away from Naka-no-Se lighted buoys D, C and B, respectively.

(e) The vessels entering the Uraga Suido Traffic Route from the open sea, especially those entering close to Kensaki, shall proceed northward as close as

possible to the centre of the Bay mouth, and avoid crossing with the vessels southward bound near the traffic route entrance.

(f) Emergency towlines (fire wires) shall be suspended and readied at the bow and stern of the vessel.

Further, the Traffic Route Control Officer has been notifying the estimated time of the passage of huge vessels, etc., to the fishing vessels through the fishermen's association during the past years. However, since April 1975, the Third Regional Headquarters of Maritime Safety Agency has established a telephone service system, enabling communication by means of public telephones or shipboard telephones, mutually between huge vessels or by other vessels concerned, of expected time of passage of huge vessels, etc. This system has been favourably received amongst those concerned.

3.2.3 Strengthening of Navigational Safety Measures.

(1) In an attempt to ensure the safety of the marine traffic in and about the traffic routes, high speed patrol boats of the Maritime Safety Agency are doing on site patrolling. However, this is usually by a single patrol boat, and it is desirable that this be strengthened for marine traffic control, traffic surveillance, prevention of accident violations, and for carrying out emergency measures and steps.

(2) An accident which saw the tanker EIKO MARU grounding in the westward section of the Naka-no-Se, in June 1975, was due to the fact that this vessel was a deep draughted vessel exceptionally approved to navigate the Naka-no-Se Traffic Route. Although these deep draughted vessels are small in number, it is necessary that improvements be carried out on the Naka-no-Se Traffic Route, starting with the removal of the sunken vessel and the dredging of the traffic route, taking into view the current situation under which these vessels have no alternative but to navigate these waters where the ship traffic is incessant.

(3) Of the navigational safety measures strengthened through administrative guidances, that concerning the taking on board of pilots is being enacted into regulation shortly, through a partial amendment of the Law concerning sea pilots, effected in July 1975, which has resulted in the whole of Tokyo Bay, including the Uraga Suido Traffic Route, becoming compulsory pilot zones. Nevertheless, it is also essential that all necessary steps also be instituted as concern other safety measures, especially those concerning the course escort vessels, the strengthening of which is being desired. Due to the fact that the escort vessels are not provided with any special

authority, there are aspects of which that makes one feel that they are not fully attaining the results expected of them by the Law. Therefore, it is desirable that a study of the system be undertaken by the administrative authorities concerned. Furthermore, those undertaking the escorting operations should prepare an escort operations manual, improve escorting techniques and training, etc., and make the escorting operations effective.

(4) As a part of the marine traffic information system of Tokyo Bay, harbour traffic control is being established within Keihin Harbour, and a radar station is being established at Kannonzaki. It is necessary that a control system covering the whole of Tokyo Bay be established, combining the foregoing.

3.3 Safety Measure Covering Berthing/Unberthing, Mooring and Cargo Operations.

3.3.1 Safety Measures under Harbour Regulation Law, Etc.

As general safety measures while in harbours, there are stipulations in the Harbour Regulation Law which must be observed as rules, especially by vessels carrying dangerous cargoes, such as the designation of anchorage, the instructions of the harbour masters when entering harbours, conditions to be met when handling dangerous cargoes, etc.

Further, the navigation within the traffic routes is principally stipulated, and there is also traffic control within harbours. However, although the Chiba Passage Route and Ichihara Passage Route are subjected to traffic controls, the area of the Sodegaura Berth to which the vessels (LNG carriers) are intended to proceed, is not subjected to regulations which cover statutory traffic routes, and there is no control over entering or leaving by means of signals.

However, the Siizu Passage Route is subjected to navigation law, being statutory traffic route.

(1) As stated earlier in the Sub-Section 2.4, the permission of the harbour master (Commander of Maritime Safety Office) must be obtained for handling cargo, when a vessel carrying dangerous or hazardous cargo intends to discharge its cargo inside of a specially designated harbour. Furthermore, when large quantities of dangerous or hazardous cargoes are to be loaded or discharged at a fixed place, the business establishment, plant, etc., managing such a place, is required to submit beforehand, an application for the approval of such pier for exclusively handling dangerous or hazardous cargoes and obtain same as concerns such pier or berth.

Especially as concerns the construction (including

modifications) of the berth for handling cargoes of liquefied gas carriers of 25,000 gross tons or larger in size, in addition to the application covering the usual exclusive pier for handling dangerous cargoes, the applicant is requested to submit a report on the construction which states the following.

(a) The reason for the construction.

(b) The construction plans.

Size scale of the pier, cargo handling equipments and capacities, mooring equipments and installations, electrical equipments, fire fighting and preventing equipments, other equipments, etc.

(c) Safety measures.

Berthing procedures, supervision of cargo operations, conditions governing the stopping of cargo operations under inclement weather, etc.

(d) Fire and accident preventing measures.

Stationing of fire and escort vessels, organization of emergency communication, casualty prevention, etc.

(e) Measures for countering or treating of accidents.

(2) Both the application for the approval and the report on the construction of a berth, shall contain in the contents the necessary measures which the managers of the berth or the cargo handlers must take in ensuring the operational safety of berthing/unberthing, mooring, cargo handling, etc., taking into consideration their possible influence on the traffic of other vessels in the harbour, the limiting of the casualty to the minimum in case of an accident, etc. The salient points of which are as follows.

(a) As a general rule, berthing and commencing of cargo operations during the night hours (from sundown to sunrise) should be avoided.

(b) The berthing speed at the dolphin type or jetty type of berth, should be at a rate which is adequately safe from the point of berth designing.

(c) The criterions for berthing in inclement weather, and for stopping cargo operations, as well as, for disconnecting the pipelines, should be based on a wind velocity of 15 m/sec or less, and/or, on wave height of 1.5 metre or less.

(d) A necessary number of tugboats possessing adequate outputs, should be employed in the berthing and unberthing.

Normally, two or more tugboats are employed, and when berthing, the total combined output is determined as being 8% of the vessel's deadweight ton-

nage, and in the case of unberthing, 5%, as criterions.

(e) Other vessels should not be permitted to approach within thirty metres of the vessel when berthed.

(f) Loading of ship's stores, bunkers, etc., as a general rule, should not be carried out while cargo operations are going on.

(g) Check lists, operations manual, fire control manual, etc., should be prepared in connection with the cargo operations, and all operations should be handled in accordance with same.

(h) In the case of liquefied gas carriers, fire boat provided with equipment capable of discharging at least two tons of fire extinguishing dry chemical, should be stationed to the vessel for security, from the time the vessel arrives outside of the harbour limits, until it completes cargo operations and sails out of the harbour limits.

(i) The machineries and other equipments of the vessel should be kept in readiness to enable the vessel to move expeditiously in an event of emergency, and also, emergency towing wires (fire wires) to be kept readied at the bow and stern.

(j) Repairs to main engine, auxiliaries, etc., which shall hinder the operation of the vessel or its shifting, etc., and repairs using flame, shall not be undertaken during the cargo operations under any circumstances.

(k) As concerns the berths for liquefied gas carriers, it shall be necessary, especially, to have provided installations which can discharge two tons of fire extinguishing dry chemicals and a water curtain system, in the area of the unloading arms.

(l) Berthing speed meter and emergency alarm apparatus should be installed at the berths which are of dolphin type or jetty type.

(3) In order to have these safety measures observed, the approving of the dangerous goods cargo handling is subjected to the condition that 'The accident preventive measures (arrangements) stated in the Application for the Approval of the Exclusive Pier for Handling Dangerous and Hazardous Cargoes', and in the 'Letter of Undertaking Safety Measures', shall be strictly observed. Moreover, in the event of the harbour master determining that the measures proposed are insufficient, as concerns the various safety measures stated, such insufficiency shall be supplemented and may be added as conditions for the approval.

Furthermore, as a matter of guidance, it may contain directives with reference to the maintaining of communication and liaison set-up at the site, gas detections as considered necessary, etc.

3.3.2 Safety of Liquefied Gas Carrier Purging Operations.

Liquefied gas carriers are not to discharge boil-off gas into the atmosphere while navigating or staying inside of a harbour. Moreover, they are subjected to especially strict guidances as concerns safety measures when carrying out cargo tank gas purging operations. The necessary particulars are to be stated in the document undertaking safety measures, and it is necessary to submit, as well, a separate report as required.

(1) The first stage of the gas purging, the warming up, is not to take place within Tokyo Bay. A report must be submitted to the Regional Headquarters of Maritime Safety Agency (Commander of Maritime Safety Office) having jurisdiction over the sea area outside of Tokyo Bay, with respect to the method to be employed, safety measures to be taken, etc.

(2) After the completion of the warming up, the vessel is to anchor at a place priorly designated by the commander of the Maritime Safety Office, inside of Tokyo Bay where the obstructing of other vessels is deemed to be small.

(3) When gas purging boat is to be employed, a distance of 100 metres or more shall be kept, away from the vent outlets. Furthermore, purging operations are to be carried out in good weather with wind velocity of less than 10 m/sec, and only during the daytime with good visibility.

3.3.3 Strengthening of Safety Measures.

These safety measures only being general measures, general rules and standards, it would be necessary to have detailed measures which are tailored and applicable to each particular berth and to the vessels in special trades, since the locations of the mooring facilities, the types of the vessels to be moored, and their sizes, are varied.

There are tendencies towards partially modifying existing berths, and attempting to handle cargoes carried on larger vessels, from the viewpoint of rationalizing maritime transportation, and further, to handle cargoes differing in their dangerous natures. As concerns these moves, it is deemed especially necessary to fully study concrete measures for their safety, and obtain conclusions before putting into actual practice,

3.4 Measures under Abnormal Weather Conditions.

3.4.1 Typhoons, etc., and Counter Measures.

As abnormal weather conditions which can be feared to render damage to vessels, the typhoon is the main one, and the others are high tide, earthquake, tidal wave, water-spout, etc., but it is extremely difficult to prepare emergency measures against those which occur suddenly and without warning. As concerns those which can be foreseen or forecasted, the preparations against these can be carried out almost similarly to the measures against typhoon. Therefore, the typhoon has been taken up in this Report, as a representative abnormal weather condition.

On the other hand, in the Spring, strong gusty winds are prevalent, due to the moving atmospheric low pressure centers, as one of the abnormal weather conditions which cause such accidents as dragging or shifting of ships' anchors, etc., and preventive preparations in line with the measures as against the typhoon are necessary.

(1) In the 70 years since 1900 (Meiji 33rd Year), typhoons and such which caused strong winds exceeding 20 m/sec within Tokyo Bay, numbered 19. The year and date of each occurrence, and their statistics are as given in the following Table.

Table 3.4.1 Typhoons which caused Strong Winds Exceeding 20 m/sec within Tokyo Bay.

D/M/Y	Weather Conditions in Tokyo			Remarks
	Min. Press. (mb)	Max. Wind	Aver. V. m/sec	
28/09/1900	983.9	SSE	25.3	
28/09/1902	958.6	E	22.4	Hightide damage in Shonan area.
07/08/1908	985.3	SSE	20.8	Hightide in Ise Bay.
26/07/1911	970.2	SSE	31.4	Great damage to Tokyo.
01/10/1917	952.7	SSE	39.6	Great damage to Tokyo
24/09/1918	982.6	SSE	24.6	House flooded in Yokohama
30/09/1920	980.3	NNW	24.1	Hightide in Setonaikai (Inland Sea)
11/10/1923	979.3	NNW	24.3	

(Cont'd on next Page)

21/09/1934	990.1	S	22.3	'Muroto' Typhoon - Casualties/damages in Osaka
01/08/1938	979.7	S	25.7	
19/09/1940	997.4	SW	25.0	
31/08/1949	986.1	SE	24.9	'Kitty' Typhoon Damage to Tokyo.
23/07/1958	986.1	S	22.8	'Alice' Typhoon.
29/09/1958	970.7	WNW	20.5	'Kanokawa' Typhoon.
26/09/1959	989.4	S	27.0	'Ise Wan' Typhoon - Great damage to Nagoya area.
16/09/1961	987.3	SSW	21.2	'Muroto' Typhoon No. 2 - Heavy damage to Osaka Bay.
18/09/1965	979.0	S	24.7	'No.24' Typhoon.
25/09/1966	991.9	S	24.5	'No.26' Typhoon.
26/06/1969	996.8	S	20.3	(Low Pressure)

(Note) As concerns the wind velocities, the following to be noted.

(a) Average velocity is the average of the velocities measured during 10 minutes.
(b) When the wind velocity is given simply as 00 m/sec, it indicates the average velocity, and when the maximum momentary velocity is to be given, it will be invariably indicated as the maximum momentary velocity xx m/sec.
(c) It can be considered that a maximum momentary wind velocity is about 1.5 times the average wind velocity.
(d) The wind velocities attributed to Tokyo are all those recorded within the compound of the Meteorological Bureau.
(e) Generally, the wind velocity at sea is higher than that on the shore, but in the case of Tokyo Bay, wind velocities exceeding 20 m/sec can be considered as being synonymous with those recorded within the compound of the Meteorological Bureau.

(f) Wind velocities measured with the airplane type of anemometer on ships, are mostly readings of the averaged indications of the indicator recordings over 10 - 20 seconds, and it seems that the wind velocities recorded in the ship's log books are about 20% greater than the averaged wind velocities based on 10 minutes' measurements.

(g) There are times when the wind directions and velocities appreciably differ at Tokyo, Yokohama and Chiba which are situated on the same Tokyo Bay.

(Taken from 'Tokyo Bay Typhoon Counter Measures' issued in February 1975)

Of the typhoons which have caused damages within Tokyo Bay, the 'Kitty' Typhoon of 1949 is considered to be a representative one in the recent years.

It has been said that ship sinkings, strandings, etc., reached about 150 in number, in the Keihin Harbours (Tokyo, Kawasaki and Yokohama) and Yokosuka Harbour.

Of the recent ones, the damages caused by Typhoon No. 26 which struck on September 25th, 1966, was heavy, accounting for 28 vessels causing accidents within Tokyo Bay, involving anchor dragging, collisions, ship floodings, etc., and of special mention, two vessels attempting to take shelter sank with a loss of nine crewmen's lives to cite an example.

(2) In an event of a typhoon approaching the line of approximately 25 degrees North latitude and a strong possibility exists of it striking Tokyo Bay thereafter, the Emergency Marine Casualty Preventing Measures Committee (Hijo Kainan Boshi Taisaku Iinkai) or Typhoon Counter Measures Committee (Taifu Taisaku Iinkai), etc., shall be called.

The main committee meetings will be attended by harbour masters (Commander of Maritime Safety Office or Base), meteorological station officials, harbour administrators, and other representatives of the administrative authourities, and by representatives of the Shipowners Association, Foreign Ship Association, Association of Ship Agents, regional shipping cooperatives, ship pilots associations, and by others representing shipping, shipowning and operating, and cargo handling stevedoring groups. It will study whether measures are necessary for having ships take shelter outside of the ports, etc., basing itself on the actual situations as exists at their individual ports and harbours, and taking into considerations the predicted course and the strength of the approaching typhoon, from the viewpoint of safeguarding the vessels in port.

The factors which will decide the timing of the notification to take shelter, include the following.

(a) The approaching speed of the typhoon.

(b) The distances from the harbours within Tokyo Bay to the 15 m/sec strong wind velocity zone.

(c) The time required by pilots', tugboats' and other organizations needed for shifting the vessels taking shelter, to mobilize the necessary pilots, tugboats, etc., other than those already on duty.

(d) The time required by the vessels to take shelter, taking into account the avoiding of movements after dark to the furtherest extent.

(e) The time required for preparing the notifications, etc.

As means to facilitate the transmitting of notifications, each harbour is provided with an emergency information communication system chart, on which the transmission of communications is based. On the other hand, wireless/radio broadcasting is undertaken by Maritime Safety Agency Third Regional Headquarters, Radio Communication Station, etc.

(3) At Chiba Harbour, the measures for taking shelter call for the large vessels taking shelter by anchoring outside of the harbour, as a general rule. While, the small vessels are to moor in orderly manner in the inner harbour mooring bays. Safety watches are to be posted without fail.

It is to be borne well in mind at Chiba Harbour, that the harbour is not too well protected against the westerly wind, and the harbour area sheltered by the breakwaters is small and narrow.

The present Articles, and the Members, of the Typhoon Counter Measures Committee of Chiba Harbour, are as given in the References 3.4.1-A and B, and the Articles, and the emergency communication and liaison chart, are now under review.

Reference 3.4.1-A

Tokyo Bay Marine Casualty Preventing Association, Chiba Chapter, Typhoon Counter Measures Committee - Articles

(Nomenclature)

Art. 1 Typhoon Counter Measures Committee shall be established within the Chiba Chapter of Tokyo Bay Marine Casualty Preventing Association (hereafter called the Chiba Chapter).

(Objective)

Art. 2 The Committee shall be a subsidiary constituent of the Chiba Chapter, to conduct all forms of investigations and researches to

contribute to the prevention of casualties due to typhoons in the Chiba Chapter district, as well as, determine the necessary measures as will conform with the situation.

(Membership)

Art. 3 The membership of the Committee shall consist of several members to be appointed by the Head of the Chiba Chapter.

(Chairman)

Art. 4 The Chairman shall be elected by mutual voting by the members. The term of office of the Chairman shall be two years, and he shall not be barred from being re-elected upon expiration of the term. The Chairman shall preside over the Committee.

(Standing Committee Member)

Art. 5 There shall be two standing members who shall be recommended by the Chairman. Their term of office shall be two years, and they shall not be barred from being re-appointed upon expiration of the term. The standing members shall assist the Chairman, and devote themselves to materializing the outstanding matters of the Committee.

(Calling of the Meetings)

Art. 6 The Chairman shall call the meetings when deemed necessary, and shall preside over same. The date and hour, and the place of meeting, as well as, the agenda, shall be decided by the Chairman.

However, as concerns the agenda, the members also can present same.

Art. 7 The minutes of the meetings shall be recorded, and the recordings shall be by the hands of the Chairman (Standing Members). Copies of the minutes shall be distributed to those concerned as necessary.

Supplementary Provisions:

Necessary matters concerning the business of the Committee and such other matters, which are not provided for in the Articles, shall be decided in the meetings of the Committee. These Articles shall come into force from September 1st, 1970.

Reference 3.4.1-B

Tokyo Bay Marine Casualty Preventing Association,
Chiba Chapter

Typhoon Counter Measures Committee

List of Members

Occupation and Title or Position	Telephone Number
Chiba Maritime Safety Office, Chief of Harbour Operations Sect.	0472-42-7238
Chiba Meteorological Observation Station, Weather Information Officer	0472-41-7911
Chiba Prefecture, General Affairs Department, Chief of Firefighting and Casualty Prevention Section	0472-23-2181
Manager of Chiba Harbour Office	0472-46-6201
Manager of Kisarazu Harbour Office	0438-36-4455
Manager of Katsunan Harbour Office	0474-33-1895
Chiba Central Police Station, Senior Chief of Harbour Station	0472-41-1599
Chief of Seashore Fire Station	0472-45-0119
President of Agents Association	0472-61-3361
Managing Director of Chiba Harbour Transportation Association	0472-27-2731
Director of Chiba Tugboat Association	0472-43-0825
Tokyo Bay Pilotage Zone Pilots Association, Chief of Chiba Office	0472-42-6391
Managing Director of Keiyo Transportation Cooperative Association	0473-33-1566
Chairman of Kisarazu Regional Shipping Association	0438-36-9129
Kawasaki Steel Corporation, Chiba Steel Plant, Sub-Section Chief	0472-64-2111
Daito Unyu (Ltd.), Chiba Branch, Manager of Ship Agency Dept.	0472-61-3111
Mitsui Shipbuilding & Engineering Co., Ltd., Chiba Shipyard, Dockmaster	0436-41-1111
Steel Transportation Co., Ltd. (Seitetsu Unyu K.K.), Chief of Harbour Management Office	04395-2-2311
Keiyo Sea Berth Co., Ltd. Managing Director	04386-2-1211
Shin Nippon Seitetsu (KK) (Nippon Steel Corp.), Kimitsu Steel Plant, Production Operations Dept., Specialist Deputy Manager	04395-2-4111

Advisers:

Commander of Chiba Maritime Safety Office.
Chief of Chiba Observation Station.
Chief of Chiba Branch Bureau, Kanto Maritime Bureau.
Chief of Chiba Harbour Construction Office, No.2 Port and Harbour Construction Bureau.
Commander of Kisarazu Maritime Safety Base.

3.4.2 Difficulty of Sheltering Vessels within Tokyo Bay.

(1) According to the 'Investigations and Researches concerning the Prevention of Casualties Involving Large Size Tankers' (by Nippon Kainan Boshi Kyokai (Marine Casualty Preventing Association of Japan), March 1969), the number of vessels possible to shelter within the whole of Tokyo Bay, taking into consideration the large vessels exceeding 20,000 gross tons in size, is 126 vessels.

Since then, Constructions of harbours and land reclamations have taken place, resulting in the sheltering water surface being narrowed down. Moreover, the necessity of securing traffic routes for the vessels entering and leaving, other than the Naka-no-Se Traffic Route, makes it necessary to consider that the number of vessels possible to shelter have been greatly decimated.

Further, on the other hand, the vessels which enter the designated harbours within Tokyo Bay, number about 100 vessels daily, even if counting those of sizes 1,000 gross tons or larger, and this number includes 9 vessels in the sizes of 20,000 gross tons or larger. Normally, typhoons exert their influence over two to three days, and it has now become extremely difficut to secure suitable sheltering water space.

(2) According to a report based on replies received in answer to its circularized inquiries (Re Measures Against Typhoon Striking Tokyo Bay - conducted in July 1973), by Tokyo Bay Marine Casualty Preventing Association,

'The first thing the medium and large size ships con-
'sider was to leave the port and take measures to
'shelter, and in the event of losing an opportuinity
'to leave the port, carry out emergency ballasting
'of the tanks and holds, and make every effort to
'prevent the ships from dragging their anchors.

'With large sized vessels, such as crude oil tankers,
'the evaluation of their safety aspects is severer
'as compared to other types. Further, in the case of
'oil tankers, the views expressed can be construed

'as being strongly against their anchoring within the 'Bay when the wind velocity was predicted to exceed '25 m/sec in Tokyo Bay.

Furthermore, according to the same investigation, the strengthening of administrative directives was raised as being strongly desirable, on matters concerning maintaining of safe distances between ships, preventing of ships cutting into line of other ships, strict maintaining of anchor watch, establishing of a system for reporting and communicating the cases of anchor draggings, concrete information concerning sheltering anchorages and on moving out of the Bay for shelter, etc.

(3) In any case, it is necessary to have safe and orderly movements for taking shelter or anchoring, and to secure water space, through coordination between the harbours, considering the whole of Tokyo Bay as comprising one single port. Although there is a need for considering measures to prevent secondary casualties, it being difficult to secure the necessary water space within the present Tokyo Bay to safely shelter the large sized vessels carrying dangerous cargoes, the first considerations should be given to having these vessels taking shelter outside of the Bay.

3.5 Organization for the Prevention of Casualty.

3.5.1 Fire Boats and Mutual Agreements.

Tokyo Bay is bordered by petroleum and chemical industrial belt unequalled elsewhere in Japan, and the number of large sized tankers carrying petroluem, liquefied gases, etc., entering the Bay is increasing yearly.

In view of this situation, and in order to prevent, as well as, limit to the minimum, fire casualties and sea pollutions, and the damages resulting therefrom, which are mainly traceable to these vessels, there are 98 boats and crafts which posses chemical firefighting capabilities, headed by three large type fire boats belonging to Maritime Safety Agency and Marine Casualty Prevention Center (Kaijo Bosai Center).

(1) Self protecting potentials of the enterprises concerned, the prompters (casualty originators), are also essential for a system to prevent casualty on the waters. While, on the other hand, the state as well as the local public bodies also retain responsibilities independently.

In an event of fire occurrence on board a tanker, fire extinguishing actions should be commenced within less than thirty minutes of the occurrence, and it would be essential to have mobilized at the site firefighting forces headed by the large type chemical firefighting boats, within about one hour's time.

For this purpose, in addition to Maritime Safety Agency's large type firefighting boat, the two fire boats under the control of the Marine Casualty Prevention Center are all placed under the unified control of Maritime Safety Agency when an accident occurs. Moreover, there is a necessity of the public and private bodies concerned concentrating their total potentials to minimize casualty as a single body.

(2) Regional casualty preventing mutual cooperative organizations are established within the regions of Tokyo Bay perimeter, as mentioned hereunder. Furthermore, large scale training drills are being organized in connection with the improving of the system for reporting accidents, establishing of a system of command and liaison, encouraging of joint actions, etc.

(a) Firefighting and Prevention Agreements.

Agreements exist between Maritime Safety Agency Offices of Yokohama, Tokyo, Chiba, and Kisarazu, and the public bodies under the jurisdiction of each, comprising the municipality, cities, and townships of Yokohama, Kawasaki, Tokyo, Chiba, Ichihara, Sodegaura, Kisarazu and Kimitsu, respectively, and between Maritime Safety Agency Third Regional Headquarters and Marine Casualty Prevention Center.

(b) Agreements for Aid and Assistance, and Dispatching of Defence Forces, in case of Casualty Occurrence.

Agreements exist between Maritime Safety Agency Third Regional Headquarters and Yokosuka Regional Headquarters of Maritime Self Defense Force, as well as, the Fourth Air Group of the same.

(c) Regional Casualty Prevention Planning.

Tokyo Municipality, Kanagawa Prefecture, and Chiba Prefecture each posses plans of measures against casualties on the sea.

(d) Council for Measures Against Oil Spillage Casualty.

There is a Council embracing about thirty bodies comprising Third Regional Headquarters of Maritime Safety Agency, local public bodies, civilian groups, enterprises concerned, etc. In addition, there is the Yokohama Harbour Casualty Countermeasures Action Headquarters, and Keihin Area Sea Berth Casualty Mutual Aid Agreement.

(e) Chiba Regional Casualty Agreement and Others.

Casualty Prevention and Aid Agreement between Tokyo Gas Sodegaura Plant and Tokyo Electric Power Thermal Electric Generating Plant at Sodegaura, and Mutual Casualty Aid and Assistance Agreement covering Anegasaki Area.

3.5.2 Accident Involving YUYO MARU NO. 10.

(1) The collison and fire accident involving the LPG tanker YUYO MARU NO. 10 (43,723 Gross Tons and 38 crewmen) and the cargo ship PACIFIC ARES (10,874 Gross Tons and 29 crewmen) was caused by the bow of the PACIFIC ARES colliding at almost right angle to the hull of the YUYO MARU NO. 10 close to the tanker's bow, on the starboard side, and ripping a large opening in the naptha tank of the YUYO MARU NO. 10 (combination carrier for carrying LPG and naptha), causing the laden naptha to catch fire and spill out. The PACIFIC ARES was completely enveloped in flames, and resulted in a disaster rarely seen even on worldwide level, with a collective loss of 33 lives on both ships. As concerns this accident -

(a) It saw self-sacrificing salvage and aid operations being tendered to the two ships on fire and drifting in Tokyo Bay, and subsequently, voluntarily grounding.

(b) There existed a possibility of series of explosions, due to the cargoes of naptha and LPG being carried on the YUYO MARU NO. 10.

(c) There was the towing of the vessel to the waters outside of Tokyo Bay, and the subsequent sinking of the tanker by Maritime Self Defense Force, etc. It was not only a fire disaster which involved a large type liquefied gas carrier the number of which has been increasing in the recent years at rapid rate, but was also the first case in Japan which saw the salvaging measures taken. It has left behind valuable reference information bearing on safety and casualty prevention measures for the future, but the sacrifice paid for them have not been small.

(2) In an event of a similar large scale tanker accident occurring within Tokyo Bay, it is essential that not only the damage to the vessel be limited to the minimum, but that measures be taken to prevent secondary casualties extending to the inhabitants and the facilities on the shore. To attain this, it is necessary that all possible fire fighting and preventing forces be mobilized and that actions be taken at the initial stage of the accident occurrence.

As concerns the YUYO MARU NO. 10 accident, the initial step of immobilizing the vessel on fire and drifting, succeeded within extremely short space of time, but it was difficult to pacify the anxiety of the local inhabitants, and therefore, emergency steps to tow the vessel outside of Tokyo Bay and having it scuttled had to be taken in the end.

3.5.3 Organizing of Casualty Preventing System and the Prevention of Accidents.

The necessity of the fire wires was proven at the time of towing the YUYO MARU NO. 10 out of the Bay, which saw superhuman actions by helicopter in attaching towlines to the vessel. It was also learned that the relatively stable explosive burning of naptha and the flaring of LPG under calm weather conditions, turned into large scale explosions once the wind and waves intensified out on the sea. Technically speaking, the extinguishing of the fire itself was not difficult, but unless an effective means for shutting off the gas is employed, it immediately turns into flame again, or disperses as gas, etc. The accident also proved the results of the investigations, researches and experimental testings, etc., previously undertaken by Nippon Kainan Boshi Kyokai (Japan Marine Casualty Preventing Association) and other organizations concerned, concerning safety measures and the measures to be taken in an event of accident occurrence involving large size crude oil tankers and liquefied gas carriers, but it also raised new questions and problems.

Although studies are being carried out in connection with the prevention of casualties, through accumulation of valuable data such as presented by this recent accident, it is essential that accidents be prevented from taking place. It is necessary to expend further efforts towards thorough education and training of ships' officers and crewmen, observing of the safety measures for navigation, etc. On the other hand, systems for preventing casualties, researches and investigations concerning equipments and materials for preventing casualties, reserving of necessary funds, equipments and materials, substantiation of the functional capacities of the casualty prevention organizations, etc., followed by studies of organized casualty preventing system and its establishment, are looked forward to.