

THE DOVER STRAIT TRAFFIC SEPARATION SCHEME AND THE COLLISION REGULATIONS

by I.D. IRVING (*)

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INTRODUCTION

This paper is a discussion of the problems experienced by navigators in the Dover Strait Traffic Separation Scheme in construing and applying the International Regulations for Preventing Collisions at Sea, 1972.

The Traffic Separation Scheme (TSS) in the Dover Strait is not new, having been in existence since 1967. International Regulations for Preventing Collisions at Sea (Collision Regulations) have existed in one form or another since 1863, over one hundred years longer. Why then, have these problems suddenly materialised ?

When the concept of Routeing was first introduced it existed side by side with, but quite independently of, the Collision Regulations. IMCO (***) produced recommendations for the conduct of vessels in Routeing Systems but the Collision Regulations, being mandatory to all ships, were the supreme authority. Then the 1972 Collision Regulations came into force in 1977, and for the first time a rule specifically applicable to TSSs was included. This rule, Rule 10, was basically an extract from the IMCO General Principles of Ships' Routeing. It now appears that, although quite suitable as a general principle, it is not so as a legal instruction liable to rigid, literal interpretation. That it is contained amongst the Steering and Sailing Rules rather than in PART A. GENERAL, and has also been selected for exclusive

(*) 120 London Road, Deal, Kent CT14 9PL, U.K.

(**) Editor's note : Now IMO (International Maritime Organization) since May 1982.

enforcement with severe penalties, has also caused its status to be artificially enhanced. This leads to conflicts both with the other Rules and with commonsense, and thus to the problems to be discussed.

In May 1979 the Nautical Institute Dover Branch held a seminar to discuss Practical Navigation in the Dover Strait. It was well attended by a wide cross section of mariners and by others connected with shipping in general. During the course of the discussion it became apparent that there are a number of aspects to navigation in the Strait with which many of those present were not happy. Consequently, a Committee of Branch members was formed to identify the particular problems and to make recommendations as to how they might be eliminated or reduced in severity.

The need for the Committee to obtain a balanced view of the problems and possible solutions as they appear to the many users of the Dover Strait required the distribution of a number of circulars and questionnaires, and careful study of the replies. This all took time, but the Committee considered it necessary in order that it might avoid making any recommendations based upon unrepresentative or biased information. Indeed, it was fear of this that caused the Committee to avoid making any direct recommendation in respect of crossing traffic in its first Report to the Nautical Institute. Since that Report, however, it has satisfied itself that it is now justified in recommending a particular solution. The work of the Committee forms the basis of this Paper which endeavours to explain the problems and describe the reasons for the recommendations for their solution.

A number of abbreviations and initials are used for the sake of brevity. A list of these is included for reference at the end of the Paper.

GENERAL

The Dover Strait and its approaches form one of the world's busiest waterways. Perhaps inevitably, therefore, it has over the years been the scene of a large proportion of the world's collisions and strandings. Precisely because of this it became the site of the world's very first Traffic Separation Scheme. At first the Scheme was only voluntary. However, the introduction ten years later of the *International Regulations for Preventing Collisions at Sea-1972* made compliance with IMCO-approved TSSs mandatory for all vessels.

The Master of a vessel transiting the Dover Strait today has a lot more in his favour than he would have had some few years ago. During the transit his vessel will become part of a comprehensive Vessel Traffic System. Command of his ship will remain firmly on his bridge, that being the best place for it, but the various facets of the system will closely guide him. His choice of route through the Strait will be governed by the TSS and Rule 10 of the Collision Regulations. They will assure him of a well-marked path through the shoals of the area that will also keep him clear of the many vessels transiting in the opposite direction. His only collision threats should come from crossing vessels and from vessels overtaking or being overtaken, both readily identifiable situations for which the Collision Regulations give clear instructions. He will receive on VHF Channel 10 (British) or 11 (French)

half-hourly broadcasts from the CNIS giving accurate up-dates on: adverse weather conditions, defective or off-station navigational marks, hampered vessels, rogues, and any other circumstances affecting the safety of navigation. In addition to all this, pilots are available should their services be desired and they may be embarked well before the vessel enters the Dover Strait.

Together, therefore, the TSS, the Collision Regulations, the CNIS and the Pilotage Service form a comprehensive package of regulation, guidance, information and advice to assist the Master towards a safe transit. However, there are still difficulties and dangers with which he has to contend. Among these are the strong tidal streams in the Strait and the traditional enemies of fog and storm. There are some new difficulties also which arise from the presence of the TSS and the application of Rule 10 of the Collision Regulations. Both of these are designed for general international use, but the physical limitations upon searoom in the Strait and the heavy density of both through and crossing traffic subjects them to a severe test which has exposed the flaws which were first discussed at the Nautical Institute seminar on Practical Navigation in the Dover Strait in 1979. Most of the flaws might be expected to appear to some extent in all those TSSs to which the Collision Regulations apply. Their effects, however, are probably magnified in the Dover Strait by the particular circumstances prevailing there.

VESSELS CONSTRAINED BY DRAUGHT

Vessels constrained by their draught, as defined by Rule 3(h), have to contend with other problems as well as that of having only limited deep water in which to navigate. The tides in the Strait can at times set them strongly towards shallow water. "Spring tides can have a remarkable effect on VLCCs near the extremity of banks..." [1]. The necessity for these ships to adhere closely to their pre-planned track can mean that a requirement for them to alter course for traffic reasons may be exceedingly embarrassing, or even dangerous.

This difficulty is recognised in the Regulations. Rule 28 gives the constrained vessel the right to exhibit a signal to indicate that she is so constrained, and Rule 18(d)(i) requires that vessels other than those not under command or restricted in their ability to manoeuvre shall "... if the circumstances of the case admit, avoid impeding the safe passage of a vessel constrained by her draught, exhibiting the signals in Rule 28". It might be expected therefore that the need would seldom arise for a constrained vessel to alter course for traffic reasons. However, timely action by ships that should otherwise stand-on is dependent upon their identifying the signal in time to avoid a close quarters situation. The night-time signal is usually readily apparent and even at such a range that all three red lights are not individually distinguishable, the existence of the red glow serves to alert the approaching vessel. The daytime signal is not so easy to see. It is a black cylinder with a diameter of at least 0.6 metre and a height of twice its diameter exhibited where it may best be seen. When exhibited over the bridge of a VLCC it appears very insignificant, even when seen from close-to. From a distance it can be very hard to spot, even when its existence is suspected. When action is required under

Rule 18(d)(i) by a vessel that would otherwise have to stand-on, and that action is dependent upon the vessel seeing and recognising the cylinder, there is a significant probability that the action will not be taken until a close quarters situation is imminent or has actually occurred. By that time the constrained vessel is herself required to give way with attendant risk and the object of the Rule is lost.

It is therefore submitted that the daytime signal for a vessel constrained by her draught is inadequate in present-day conditions and that it should be changed to something more readily detected. It is suggested that an increase in the size of the cylinder, more in keeping with the scale of a VLCC, and/or a stipulation as to where in the vessel it should be exhibited might serve the purpose. Alternatively, perhaps a high-intensity light of prescribed rhythm and colour might effectively catch the eye and could also be used at night.

LARGE VESSELS

Speakers and delegates at the Seminar discussed the special problems of large vessels. It was pointed out that a VLCC in the Strait, whether or not she was constrained by her draught, was probably restricted in her ability to manoeuvre in accordance with the Regulations by her size and low power/weight ratio. Taking into account the Lane widths and the likelihood that a crossing vessel might not adopt her crossing course until nearly in the Lane, doubt was expressed as to the ability of a VLCC steaming at slow speed to achieve, in the time available to her, sufficient change of direction or speed to avoid a collision by her own actions alone with a 15-knot stand-on vessel approaching on a course at right-angles to hers. Despite her inability to manoeuvre as required, there is no provision within the Regulations for her to indicate this to approaching vessels. The definition in Rule 3(g) of the term "vessel restricted in her ability to manoeuvre" refers to the nature of the vessel's work as the restricting factor, whereas the VLCC is restricted solely by her own lack of manoeuvrability. She is not therefore permitted to show the signal prescribed in Rule 27(b) which might otherwise be considered the most appropriate. Nor is she able to exhibit the signals contained in Rule 27(a) for a vessel not under command, as the definition in Rule 3(f) of such a vessel requires the inability to manoeuvre as required by the Rules to be due to "some exceptional circumstance". It might perhaps be argued that the conditions prevailing in the Dover Strait (i.e., limited searoom, narrow traffic lanes, high density traffic, numerous crossing vessels frequently steering straight courses for only short periods of time), constitute an exceptional circumstance. If that argument were upheld, however, it would radically change the presently accepted meaning of the term "not under command".

The Committee considered it important that a VLCC should be able to indicate to approaching vessels that she is restricted in her ability to keep out of the way. It recommends that special rules, similar to those for the Straits of Malacca and Singapore (IMCO res. A.375 (X), ANNEX 5) be introduced for VLCCs in the Dover Strait, including a definition of what constitutes a VLCC and granting authority for them to exhibit a signal indicating their restricted ability to manoeuvre.

vre [2]. Such rules should also serve to check the misuse of the "constrained by draught" signal by those vessels who presently exhibit it solely in order to evade their responsibility to give way.

HOVERCRAFT

Hovercraft first started to operate on a regular basis in the Dover Strait in 1968. Since then their numbers and the frequency of crossings has increased to the extent that they now form a significant proportion of the crossing traffic. The types of craft in use operate at speeds of up to sixty knots and, being of the "fully skirted" variety, are subject to drift angles, depending on the wind, of up to twenty-five degrees.

At the onset of hovercraft operations in the Strait it was understood that they would keep out of the way of all other vessels [5]. It was subsequently decided that the difference in performance capabilities of the various types of hovercraft made this unsatisfactory as a general Rule and in the 1972 Collision Regulations Rule 3 (a) specifically includes non-displacement craft in the definition of the word "vessel". Hovercraft are now therefore required to comply with the Regulations in the same way as any other power-driven vessel, and give-way or stand-on as appropriate.

There are few difficulties when the hovercraft is the give-way vessel. An alteration of course of ten degrees or so is usually ample to achieve the desired safe passing distance. It is when the conventional vessel is required to give-way that difficulties may arise, and these are caused by the speed and drift of the hovercraft.

When a conventional ship steaming at fifteen knots encounters a sixty-knot hovercraft crossing at right-angles on a collision course their combined closing rate is approximately sixty-two knots. When the hovercraft is on the ship's starboard side the ship is the give-way vessel under Rule 15. The action she then has to take to achieve a particular passing distance depends upon the distance apart of the vessels when that action is initiated. That, in turn, depends upon the distance apart when the ship first appreciates that the hovercraft is a threat.

It is quite probable that the existence of the threat will not be determined by the ship until the hovercraft is significantly closer than would be the case if both were ships. This is due solely to the speed of the hovercraft. The fast closing rate means that every minute spent in ascertaining whether risk of collision exists represents a decrease in the range of over one mile. Were the threat from another fifteen-knot ship, that minute would represent only 1/2 mile. Additionally, if the ship is using a visual look-out as the principal means of detecting approaching vessels, the aspect of the hovercraft may initially give the impression that it will pass clear and thereby further delay the realization that a collision situation exists.

The abundance of other distractions, in the form of ships, fishing vessels, yachts, other hovercraft, and even swimmers, makes it unlikely that the hovercraft will be detected at a range of more than six miles. Frequently it will be less. Therefore, the ship in this example has less than six minutes in which to recognise and respond to the threat and achieve the desired result. In order to pass 1/2 a mile

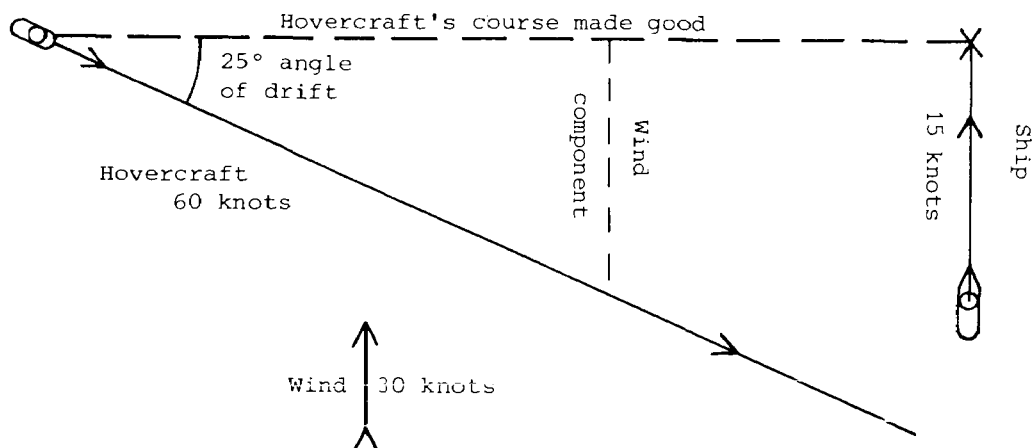


FIG. 1. – Both the hovercraft and the ship each has the other on its own port side, and it appears that they should pass clear. However, the wind causes the hovercraft to make an angle of drift of 25° , causing the hovercraft to make good a course along the dotted line to point X where, unless evasive action is taken, she and the ship will collide. Rule 15 directs the vessel which has the other on her own starboard side to keep out of the way. By implication, the vessel which has the other on her own port side should stand-on. In this example, therefore, BOTH vessels should stand-on.

from the hovercraft, the ship must alter course some forty degrees to starboard or reduce speed to ten knots instantaneously. In practice, allowing two minutes to assess the risk and calculate the manoeuvre, and for advance or run-on, the alterations will be more in the region of ninety degrees or zero knots. This is feasible in theory but difficult in practice and one might suggest that it is seldom achieved. This may be due to the proximity of other vessels or possibly simply to the lack of realization by navigators of the requirement to execute such drastic manoeuvres.

The confusion that may be caused by the drift of hovercraft is demonstrated by figure 1. This is the most extreme example likely to be met with in practice. The two vessels in the diagram are crossing on a collision course. Each vessel has the other on her port side. Each is therefore the stand-on vessel under Rule 15. The hovercraft's yellow flashing light, required by Rule 23 (b), should serve to warn of this problem, but the solution requires a bending of the Rules by at least one of the participants.

Hovercraft pilots are well aware of all these difficulties and, in general, take early evasive action to avoid a close-quarters situation [3]. Captain SYMS says that "There is no denying that... every hovercraft Captain and Navigator approaches any situation initially from the point of view of a giving-way vessel... [4]. Rules 2 (b) and 17 (a)(ii) of the Collision Regulations require due regard to be had to "all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, ..." and permit the stand-on vessel under specific circumstances to "take action to avoid collision by her manoeuvre alone..." respectively. The hovercraft Captain is presumably, therefore, covered for his actions, and it may be said that the Regulations, therefore, adequately deal with the

situation. But it is the Navigator in the give-way ship who has the problem, and Rule 17 goes on to remind him in part (d) that he is not relieved of the obligation to keep out of the way. His problem therefore remains.

One way of lessening the problem would be to include hovercraft in Rule 18 (e) and require them, like seaplanes, to "...in general, keep well clear of all vessels and avoid impeding their navigation". The ensuing requirement to comply with the Rules in circumstances where risk of collision exists would, however, result in a reversion to the present unsatisfactory situation at a critical time. An alternative solution, that has been received with some interest by hovercraft personnel when previously discussed, is to re-classify the air-cushion vehicle flashing yellow light required by Rule 23 (b) as a signal to indicate that the vessel exhibiting it will keep out of the way of all vessels not exhibiting that signal. This also possesses the merit of including a failsafe in that a hovercraft experiencing difficulties, or of a type not having the manoeuvrability of those being discussed here, would not exhibit the signal and thus fall into the category of "vessel".

CROSSING TRAFFIC

The undoubted success of the Dover Strait Traffic Separation Scheme in reducing the number of collisions in the area has been achieved for the most part by separating the opposing streams of through traffic and thereby reducing the number of head-on encounters. In most TSSs this would result in the virtual elimination of all end-on situations. In the Dover Strait, however, the number of crossing vessels may equal or even exceed the number of through vessels. The subject of the problems experienced by crossing vessels, and the difficulties that crossing vessels present to through traffic, became one of the principal points of discussion at the Seminar and at various meetings since. Widely differing opinions have been expressed of the nature and significance of those problems, depending upon the viewpoint of the observer, and similarly differing solutions proposed.

The Committee was therefore faced first of all with the task of ascertaining which problems, if any, do exist and the degree of importance that should be attached to them. Being aware that the attainment of perfection is unlikely in any human endeavour, and that the system apparently works well in other parts of the world, the Committee had no desire to solve a set of problems, possibly with the risk of detracting from the safety of navigation in other ways, unless those problems were both real and significant. The procedure described at the beginning of this paper finally led the Committee to the conclusion that the principal problems in relation to crossing vessels that significantly detract from the safety of navigation are :

- (a) the zig-zag (dog-leg) courses steered by crossing vessels in order to comply with Rule 10 (c);
- (b) the constraint imposed by Rule 10 (c) upon the choice of a safe crossing course;
- (c) the conflict between Rule 10 and Rule 15;
- (d) the conflict between Rule 10 and Rule 17;
- (e) the effect that the knowledge of the existence of traffic surveillance has upon the mariners' choice of anti-collision manoeuvres.

A further problem, of relatively minor importance so far as safety is concerned but which is fundamental to all the other problems and which looms particularly large in the minds of mariners faced with traffic surveillance by shore-based radar, is:

(f) the meaning of the phrase contained in Rule 10 (c) "... shall cross as nearly as practicable at right angles... ».

The Meaning

To discuss the last problem first, it is clear that there is some confusion amongst mariners as to whether "shall cross" means "shall steer a course" or "shall make good a course".

Discussion at the Seminar appeared to indicate that the majority of mariners understand the words "shall cross" to mean "shall steer a course", but it was pointed out that case law tends to look upon "steer" as meaning "make good" [6]. Of those mariners questioned, independently of the seminar, on their understanding of the phrase, some sixty per cent gave "shall steer a course" as their choice of meaning. Interestingly, very few of those questioned considered that ambiguity existed in the wording of the Rule. Most believed that their particular interpretation was expressed quite clearly.

Those who support the "shall make good a course" interpretation point out that the requirement contained in the Rule is to "cross as nearly as practicable at right angles to the general direction of traffic flow". The general direction of traffic flow is dictated by the orientation of the Traffic Lanes and is therefore fixed and unaffected by any outside influences such as tide or wind. Therefore, in order to "cross as nearly as practicable at right angles" to that pre-determined direction of traffic flow, the crossing vessel must achieve a pre-determined course by allowing for tidal set and leeway as necessary. That is, she "shall MAKE GOOD A COURSE as nearly as practicable at right angles".

An additional factor that reinforces this view in the minds of navigators in the Dover Strait is that the much publicised system of radar surveillance includes amongst its functions the policing of the area, and the detection and reporting of vessels considered to be contravening Rule 10. Shore based radar is, naturally, ground stabilised and indicates a vessel's course made good. Also naturally, therefore, many mariners look to ensure that it is their course made good that crosses at right angles.

Those supporting the "shall steer a course" interpretation believe that all the Rules contained in Part B (The Steering and Sailing Rules) of the Collision Regulations direct the manner in which vessels, under particular stated circumstances, must be STEERED and sailed. Those particular circumstances, when they involve more than one vessel, are defined by the aspects of the vessels to each other or their relative bearings or motions, all of which are dependent upon their courses steered. It is, therefore, quite wrong to introduce additional, irrelevant criteria such as set and leeway into the interpretation of just one paragraph of one particular Rule.

The Committee favours the "shall steer a course" interpretation, believing that it meets the intention of Rule 10 (c) by producing an unambiguous crossing

situation between through traffic and crossing vessels, thereby ensuring that there is no doubt as to whether a vessel is following a Lane or crossing it, no doubt as to which Rule applies when risk of collision exists and therefore no doubt as to the action required of the vessels involved. If the "shall make good a course" interpretation was to be accepted it would immediately introduce a degree of doubt to all these situations when vessels are obliged to allow for set and leeway, and would re-introduce the dangerous fine-angle encounter situation, this time between crossing vessels on reciprocal tracks.

The Dog-Leg Courses Steered by Crossing Vessels

"Crossing vessels, and in particular crossing ferries, are now steering a 'dog-leg' track in order to comply with the requirement of Rule 10 (c). The resultant large alterations of course at high speed on the edges of the Lanes make conventional radar plotting difficult, can cause confusion to through vessels, and are not in accordance with basic anti-collision precepts which anticipate that vessels other than 'give-way' vessels will maintain their course and speed. The problem becomes more dangerous when a vessel approaching the Lanes from an Inshore Zone alters course to port to remain within that Zone until it is safe for it to enter the Lane and cross at right angles" [7].

The principle method of determining whether risk of collision exists is by carefully watching the compass bearing of an approaching vessel. If the bearing does not appreciably change, such risk is deemed to exist. Rule 7 - Risk of Collision, states the methods by which the bearing must be watched and conclusions reached, and warns of two particular considerations that "shall be amongst those taken into account" [11]. One consideration that is not mentioned, but which is fundamental, is that the method depends in practice upon both vessels maintaining a steady course and speed. The moment either vessel alters her course or speed the answer is invalidated. Only when the alteration has been completed, and both vessels are once again maintaining a steady course and speed, may the exercise be repeated and the new answer eventually found.

Traffic and navigation experience usually render it impractical for the crossing vessel to adopt the right angle crossing course directly from her point of departure in the Inshore Traffic Zone (ITZ). She must therefore make a large alteration of course, of perhaps seventy degrees, before she enters the Lanes. This makes it difficult for her to assess the likely future traffic situation and increases the probability of her putting herself into a collision situation with through traffic when she does alter course.

Although this problem is caused by the manœuvres executed by the crossing vessel in order to comply with Rule 10 (c) as she starts to cross the Lanes, it is the through vessel that bears the brunt of this erratic behaviour. She has no certain way of knowing whether a vessel observed in the ITZ intends to cross, or when or where she will alter course to do so, if that is her intention. The only certainty is that, if the vessel does start to cross and a collision situation develops, the through vessel will be the one required by Rule 15 to keep out of the way. Figure 2 illustrates the reason for this.

It will be realized that the maximum time available for the through vessel to assess the situation and manœuvre as necessary depends upon her distance from the outside boundary of the Lane plus the distance of the crossing vessel inside the ITZ when that vessel adopts the crossing course, i.e. the time during which the crossing vessel maintains her course and speed prior to reaching the point at which she passes clear or collision occurs. Any assessment made before the crossing vessel adopts her crossing course and speed is invalidated as soon as she does so. It may be said that the through vessel is subjected to a period of doubt whilst initially watching the vessel in the ITZ, followed by surprise when the alteration of up to ninety degrees is made to cross the Lanes, and then alarm as the need for a large anti-collision manœuvre becomes clear. One hopes that this over-states the case, but it provides an indication of the unsatisfactory nature of the situation.

The length of the period of doubt, and the degrees of surprise and alarm, are reduced the further apart the vessels are when the crossing course is adopted. In the Dover Strait, Lane widths of less than four miles, coupled with ITZ that, in places, are only one and a half miles wide, severely limit the maximum distance at which this may occur. When other traffic, or simple lack of appreciation of the problem, leads to a combination of a through vessel navigating close to the outside boundary and a vessel that wishes to cross altering on the edge of the Lane, the minimum distance may be very short. The elements of surprise and alarm may indeed be real and, added to this, any alteration of course to starboard by the through vessel will direct her out of the comparative safety of the traffic Lane into the two-way traffic in the ITZ.

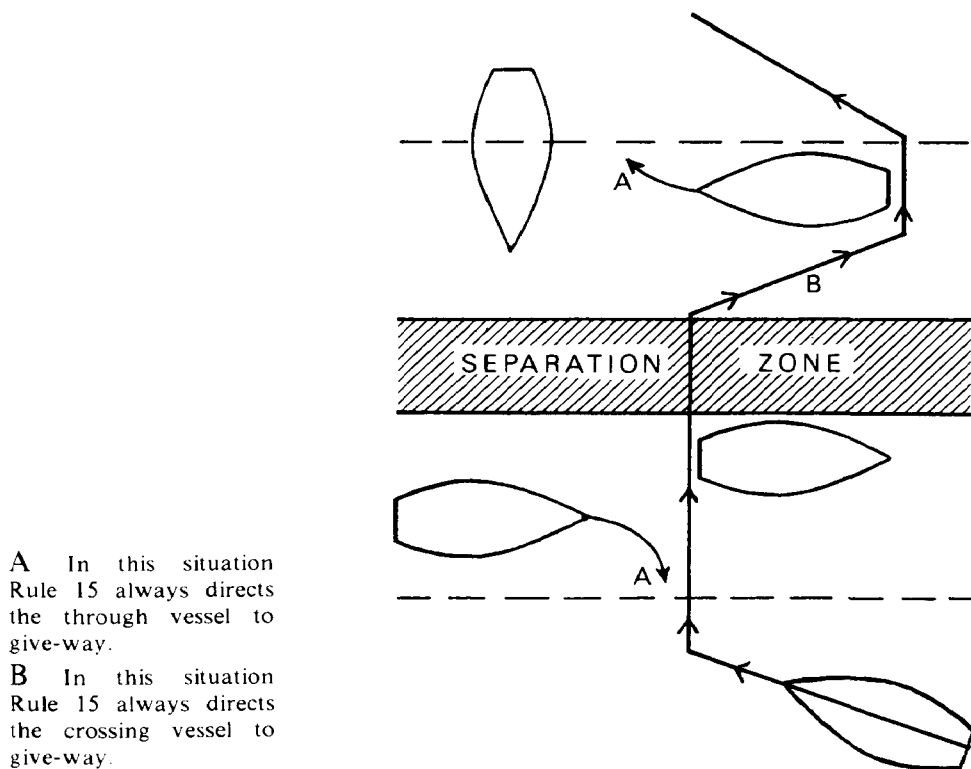


FIG. 2

A further source of danger arises when a crossing vessel approaching the Lane realizes that the adoption of the right-angle course will result in a collision situation with through traffic in the Lane. She is then faced with choosing between :

- (a) adopting the right-angle course;
- (b) entering the Lane on her existing course;
- (c) altering course to starboard;
- (d) stopping;

or

- (e) altering course to port.

Every one of these alternatives possesses disadvantages. If she adopts the right-angle course she deliberately introduces risk of collision where none previously existed, probably contravenes Rule 2 (b), and causes the through vessel the difficulty discussed above. If she enters the Lane on her existing course she possibly contravenes Rule 10 (c), will be classified as a "rogue", and will be acutely aware of the risk of punitive action being taken against her at some future date. An alteration of course to starboard to remain outside the Lane will merely maintain the status quo as she and the through vessel steam in parallel until any speed differential changes the situation. This is likely to take too long to be seriously considered. To stop may be the best alternative, but only if other traffic permits, weather conditions are suitable and there is searoom. The act of stopping is not so readily apparent to other vessels as a change of heading, so any tendency for her to fall off as steerage way is lost may cause confusion. The last alternative is to alter course to port to remain outside the Lane until the through vessel is past and clear. This may seem at first to be the best action to take, as it results in the vessels steaming in opposite directions and therefore clearing in the shortest possible time. However, it possesses the inherent danger of involving a starboard to starboard passing. Should a through vessel, observing the other on her starboard side, alter course to starboard in accordance with Rule 15 to pass astern of her, the likelihood of collision becomes both real and imminent.

Such a selection of alternatives puts the crossing vessel in an unhappy position, but at least she is left with the initiative and knows her own intentions. The through vessel cannot know what they are until they have been carried out, and can only wait to see whether she is suddenly going to become the give-way vessel with not very much time in which to respond.

The Constraint

Rule 10 (c) states : - "A vessel shall so far as practicable avoid crossing traffic lanes, but, if obliged to do so, shall cross as nearly as practicable at right angles to the general direction of traffic flow".

Thus is removed any choice of crossing course. Any variation from the right angle course is limited to that deviation that may be required in order to comply with the other Rules when risk of collision exists.

If she is to comply with Rule 10 (c) the crossing vessel should not start to cross until she has gained a position within the ITZ from which she may steer the

right angle course without danger from such navigational hazards as shoals in the area between the Lanes. In the Dover Strait most crossing vessels endeavour to combine this with a gap in the traffic in the first Lane in order to spare that traffic, and themselves, the problems previously discussed associated with the "dog-leg". Having once started to cross she must permit herself to be precipitated into any situation that may lie in wait for her. She will probably observe that situation developing, but is obliged to continue on her course until the danger is sufficiently imminent for one of the other Steering and Sailing Rules to over-ride Rule 10. Not for her the small, early alteration that would prevent the risk occurring at all, for that would place her in contravention of Rule 10 (c).

The same difficulty is experienced by vessels wishing to cross one Lane from the other in order to gain the ITZ. In the Dover Strait these are frequently vessels bound for the Thames that have arrived in the North-East Lane, and include VLCCs with their attendant handling problems. From July 1982, when the eastern extremity of the English ITZ is to be moved, the number will be increased by vessels bound for United Kingdom east coast ports. They are denied the freedom to select the safest and most expedient course through the traffic in the South-West Lane, to which they are the give-way vessel, and have to place themselves beam-on to the tide and prevailing wind at a time when they would presumably prefer to pay particular attention to staying on track. "The course which may well be safe and practicable for a fast, highly manoeuvrable ferry, could equally be suicidal for a VLCC at reduced speed across the tide"[8]. If the opportunity to cross the South-West Lane at right angles does not arrive before the vessel reaches the area of the MPC Buoy she has to give up the idea for the time being and cannot try again until she has steamed some thirty miles around the Sandettie Bank to the F2 Buoy [9].

The Conflict between Rule 10 and Rule 15

Rule 10 directs that vessels in a Traffic Separation Scheme either follow a Lane in the correct direction for that Lane or cross at right angles. Rule 15 directs that, when two power-driven vessels are crossing so as to involve risk of collision, the vessel which has the other on her own starboard side shall keep out of the way and shall, if the circumstances of the case admit, avoid crossing ahead of the other vessel. Taken individually, both these Rules seem simple and sensible. Taken in conjunction, as they must be in a TSS, they conflict, in that any vessel crossing a Lane that is obliged to give-way to a through vessel on her starboard side is directed off the right-angle crossing course onto a course against the general direction of traffic flow. When more than one through vessel becomes involved, as can frequently happen, the crossing vessel may find herself obliged to steer a course directly opposed to the general direction of traffic flow. The alternative, which is to slow down or stop, will just as frequently lead to problems from other vessels which would otherwise have passed clear.

The Conflict between Rule 10 and Rule 17

This conflict manifests itself as the crossing vessel alters course to take up the right angle crossing course prior to entering the first lane. To any through vessel in that Lane that has been observing her with a view to taking avoiding action, she is the stand-on vessel and should keep her course and speed but, because she is obliged to cross the Lanes, she must comply with Rule 10 (c) and alter course.

The Effect of Traffic Surveillance

There is no doubt that navigators are aware of the existence of traffic surveillance in the Dover Strait. They can hardly fail to be, when they hear reports of "rogues" broadcast at half-hourly intervals by the CNIS. Nor can they be unaware of the importance attached by the surveillance organization to compliance with Rule 10.

The reduction in the numbers of "rogues" since surveillance started demonstrates its deterrent effect and the impact it has had upon that particular aspect of safety. This is not surprising when one considers the magnitude of the sanctions that may be imposed upon the Masters of some vessels should they contravene Rule 10. For instance, Masters of British ships may be fined up to £50,000. Nor can it be surprising that greater emphasis frequently appears to be placed upon being seen to comply with Rule 10 than on taking early action to comply with the other Steering and Sailing Rules. Both Masters and Pilots of through vessels complain that crossing vessels that should give-way often stand-on nowadays for much longer than used to be case before they give-way. This leads the stand-on vessel to doubt whether the give-way ship will keep out of the way, introduces a danger that did not previously exist, and has been blamed for a number of "near-miss" situations[10]. The only possible reasons for this reluctance of crossing vessels to give-way when required are ignorance of Rule 15 or undue attention to Rule 10 (c). As the majority of crossing vessels are ferries and "... only by adhering strictly to the Rule of the Road can a Ferry Master survive"[12] the first possibility must be disregarded in most cases. This leaves undue attention to Rule 10 (c) as the reason and one assumes that this is due to the over-emphasis and too literal interpretation of that Rule by the surveillance system and shore authorities. The closer liaison through the Nautical Institute of the Coastguard and local mariners involved in cross-Channel shipping appears to have increased understanding and allayed fears, resulting in greater readiness to give-way early.

The Cause

Having identified and studied the problems it appears that they all possess as a common cause the requirement for crossing vessels to steer a specified course. That the specified course lies at right angles to the general direction of traffic flow is in itself unimportant. The problems are caused by the inflexibility of the course as it crosses the Lanes, coupled with the frequent impracticability of its early adoption in the ITZ.

The Solution

The requirement for vessels crossing traffic lanes to steer the specified course is laid down in Rule 10 (c). The suggestion that careful rewording of the Rule would be the best method of removing the problem was one of the first proposed to the Committee. The idea was studied at great length, but the difficulty lies in achieving the necessary balance between providing sufficient freedom for the crossing vessel and retaining the purpose of the Rule by producing an unmistakable crossing situation and minimum crossing time. It is considered important to retain these functions of the Rule in order to avoid reduction of its effectiveness in TSS elsewhere. It was finally decided that a satisfactory balance could not be achieved, and the Committee could initially only decide that: "While the dangerous crossing pattern is the easiest and the most important problem identified, a constructive solution to it has been the most difficult to find", and "The aim of the recommendation should be to avoid the 'dog-leg' and to allow a single crossing course without the rigidities of the right angle, yet at a sufficiently large angle to ensure that the crossing vessel is recognised as such. The Dover Branch Committee strongly endorses Commandant Oudet's view read out at the Seminar that the Rule is badly worded and that the interpretation does not accord with the original intentions of the legislators..." [13].

The alternative is to find a purely local solution to what are apparently purely local problems. The dangers of such a solution were made clear at the Seminar where it was pointed out that the introduction of local exemptions from, or additions to, the Collision Regulations would in effect result in a form of "Dover Straits Collision Regulations", and could be the precursor of a whole series of local collision regulations for various parts of the world. Thus the word "International" would be removed from the title "International Regulations for Preventing Collisions at Sea", with consequent confusion and possible chaos as navigators grapple with differing sets of Rules governing different sections of their routes.

To avoid this pitfall it was decided to investigate ways in which the TSS might be adapted to better provide for the large number of crossing vessels. Study indicated that the provision of "gates" in the Separation Zone would merely aggravate the situation, for by concentrating crossing traffic into a smaller area the freedom to manoeuvre would be further decreased and the risk of collision increased. Rule 10 (c) would still apply and the "dog-leg" would remain. Traffic lanes for crossing vessels would suffer from all the same disadvantages except that Rule 10 (c) would no longer apply. However, it would be replaced by the requirement of Rule 10 (b) (i) to "proceed... in the general direction of traffic flow for that lane". In any case, the local topography prevents the extension of such lanes sufficiently far into the existing ITZ for them to be either practical or effective in removing the problem of the dog-leg.

As attempts to modify either the Rule or the TSS had failed to provide a solution, the next step was to consider removing entirely the effects of one or the other. This may be achieved by declaring Rule 10 (c) invalid in the Dover Straits TSS or by withdrawing the TSS itself.

Invalidation of Rule 10 (c) involves the introduction of a local rule, with the associated dangers outlined previously. Withdrawal of the TSS sounds like heresy.

Perhaps surprisingly, however, it was found that a form of limited withdrawal of the TSS provides the best solution to the problems yet proposed.

Rule 10 applies to TSS adopted by the Organization (IMCO). Withdrawal of a section of the TSS in the Dover Strait renders Rule 10 inapplicable in that section of the Strait. Crossing vessels are therefore freed of the constraints imposed by paragraph (c) of that Rule, and so need not follow the dog-leg and may select the best course across. Withdrawal of Rule 10 also removes the conflicts with Rules 15 and 17.

Complete removal of a section of the TSS also means the removal of the undoubted benefits accruing to the Scheme. This is unacceptable. However, Part A of the IMCO resolution on Ships' Routeing defines in paragraph 2.1.(j) a Precautionary Area. This is: "A routeing measure comprising an area within defined limits where ships must navigate with particular caution and within which the direction of traffic flow may be recommended". Paragraph 2.1(m) defines a recommended direction of traffic flow as: "A traffic flow pattern indicating a recommended directional movement of traffic in a routeing system within which it is impractical or unnecessary to adopt an established direction of traffic flow".

A Precautionary Area, strategically positioned to replace a section of the TSS and including recommended directions of traffic flow for through vessels will serve to:

- (a) alert mariners to the need to "navigate with particular caution" in an area of dense traffic;
- (b) maintain the present separation of through traffic on opposing courses;
- (c) remove the existing problems relating to crossing vessels as Rule 10 will not apply;
- (d) encourage through vessels that have become mesmerized by the motorway aspect of the TSS to give-way when it is their duty to do so.

Positioning, and the precise limits of a Precautionary Area are most important. The Committee consider that it should replace as large a part of the TSS as is necessary for crossing vessels to derive the maximum benefit, compatible with retaining the maximum possible degree of safety for all vessels. This criterion requires that the area should be so positioned and defined as to:

- (i) cover as much as possible of the tracks within the present TSS that crossing vessels would be expected to follow if free of the duty to cross at right angles, thereby avoiding concentration of crossing vessels and giving them maximum freedom;
- (ii) replace as little of the TSS as is necessary to satisfactorily fulfil (i), thereby limiting the reasons for through vessels to stray from the recommended tracks and the opportunities for those undesirable activities presently prevented by Rule 10;
- (iii) cause through vessels to enter on a track dictated by the direction of the lane in which they approach the Precautionary Area and which may be maintained through it and into the resumption of the lane, thereby aiding the continued separation of through traffic on opposing courses.

Requirements (i) and (ii) exemplify the compromise involved, but it is considered that this may be satisfactorily achieved by discontinuing the TSS between a line drawn from the ZC2 Buoy through the North-East Varne Buoy in the

south-west, and a line drawn between the Outer Ruytingen South-West Buoy to the South-East Goodwin Buoy in the north-east, redesignating the area between the lines a Precautionary Area and recommending the direction of traffic flow within the Precautionary Area in the same directions and in the same places as in the present Lanes. Although compliance with the Recommended Direction of Traffic Flow will not be mandatory, the effects of requirements (ii) and (iii) and the presence of radar surveillance will strongly discourage through traffic from not complying.

The Committee therefore recommends the introduction of a Precautionary Area as described above. The Annexe reproduces the relevant part of the Recommendation put to the Nautical Institute Council.

CONCLUSION

The present Dover Straits TSS encompasses an area that is peculiar in its complexity of shipping routes, density of traffic, offshore dangers and confined searoom. That problems have been shown to exist is no adverse criticism of the TSS or the Collision Regulations, or of their intentions or authors. The major part of this Paper is taken-up with discussion of the conflicting requirements of traffic in the Strait, and the fact that the safety of navigation has been so greatly improved since the introduction of Routeing speaks best for its success in bringing order out of what may fairly be described as chaos. It is due only to the general improvement in safety that the problems discussed have assumed the importance they now have. The Committee is grateful to those who originated and instituted the present Scheme and its Rule, and it is against the background of the benefits derived from their work that the recommendations presented herein have been formulated and are proposed.

Abbreviations Used in the Text

CNIS	Channel Navigation Information Service
Collision Regulations	International Regulations for Preventing Collisions at Sea, 1972
Committee	Nautical Institute Dover Branch Committee set-up in 1979 to examine the problems
ITZ	Inshore Traffic Zone
Seminar	Nautical Institute Dover Branch "Discussion of Practical Navigation in the Dover Strait", May 1979
TSS	Traffic Separation Scheme

REFERENCES AND ACKNOWLEDGEMENTS

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- [2] "Recommendations for Improving the Safety of Navigation in the Dover Strait", para. 13, *Seaways*, April 1980, N.I.
- [3] As reference number 2, Para. 23.
- [4] Capt. R. SYMS, BSc, MNI : "Development of Hovercraft Operations", Practical Navigation in the Dover Strait, p. 42, N.I., 1979.
- [5] As reference number 4.
- [6] Capt. R.K.N. EMDEN : "Channel Information Services : Improving Safety in the Dover Strait", Practical Navigation in the Dover Strait (Proceedings, p. CE 1), Nautical Institute, 1979.
- [7] As reference number 2, Para. 3.
- [8] Capt. P.J.D. RUSSELL, FNI : "The Practical Problems of the Pilot", Practical Navigation in the Dover Strait, p. 17, N.I., 1979.
- [9] As reference number 8, Page 12.
- [10] As reference number 8, Page 16.
- [11] Rule 7 (d), International Regulations for Preventing Collisions at Sea, 1972.
- [12] Capt. J. ARTHUR, MNI : "Problems of a Cross Channel Ferry Master", Practical Navigation in the Dover Strait, p. 48, N.I., 1979.
- [13] As reference number 2, Paras. 5, 6 and 7.

ANNEXE

Extract from "Recommendations to Improve Safety of Navigation in the Dover Strait"

- 3.1 In attempting a solution on the lines discussed above, the Committee has drawn heavily on this IMCO resolution (A.378X) entitled 'General Provisions on Ships' Routeing'. The following extracts from the resolution are quoted in support of the submission :

1 Objectives

1.1 The purpose of ships' routeing is to improve the safety of navigation in converging areas and in areas where the density of traffic is great or where the freedom of movement of shipping is inhibited by restricted searoom, the existence of obstructions to navigation, limited depths or unfavourable meteorological conditions.

- 3.2 Listed under the 'precise objectives of any routeing system', the following sub-paragraphs are relevant to the Dover Strait scheme :

- 1.2 (a) The separation of opposing streams of traffic so as to reduce the incidence of head-on encounters;
- (b) The reduction of dangers of collision between crossing traffic and shipping in established lanes;
- (f) The reduction of risks of grounding by providing special guidance to deep draught vessels in areas where water depths are uncertain or critical.
- 3.3 The Committee submits that while the Dover Strait scheme effectively complies with paragraphs 1.2 (a) and (f) in achieving the desired main objective of improving the safety of navigation as stated in paragraph 1.1, the same cannot be said of paragraph 1.2 (b). In fact, it could be argued that the scheme is promoting quite the opposite result and is actually increasing the dangers of collision between crossing traffic and shipping in established traffic lanes.
- 3.5 5.4 Routeing systems should be reviewed, re-surveyed and adjusted as necessary, so as to maintain their effectiveness and compatibility with trade patterns, offshore exploration and resource exploitation, changes in depths of water, and other developments.
- The Committee makes its submission on the basis of the above provision.

3.6 6 *Design Criteria*

Traffic separation schemes

- 6.7 The extent of a traffic separation scheme should be limited to what is essential in the interests of safe navigation.

Converging and junction areas

- 6.14 Whichever of the several available routeing methods is chosen for use at a route junction or in a converging area, it must be a cardinal principle that any ambiguity or possible source of confusion in the application of the Collision Regulations must be avoided. This principle should be particularly borne in mind when establishing or recommending the direction of traffic flow in such areas.

- 6.15 At route junctions the following particular considerations apply :

(c) the need to enable a stand-on vessel to maintain a steady course, as required by the Collision Regulations, for as long as possible before the route junction.

- 3.7 The Committee submits that although paragraphs 6.14 and 6.15(c) refer specifically to converging and junction areas, the principles involved must have relevance to the Dover Strait, considering the high volume of crossing traffic is in effect creating a 'crossing junction'.