

FORUM

Direction Indication Lights

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A RECENT Admiralty Notice to Mariners (No. 1555/1968) advises that a vessel trading the southern North Sea and the English Channel has been fitted with experimental direction indication lights in order to indicate to an approaching vessel the direction in which she is altering course and the duration of the alteration. The positioning of these lights are 10.5 ft. higher than the after mast-head light and 4 ft. outboard on each side of the centre line, and they are coloured red to port and green to starboard. When altering course the appropriate light flashes until the vessel is steadied up on her new course.

Unfortunately, the lights are designed to be visible for a distance of up to 1½ miles and in my opinion until that distance off is reached the direction indicator lights will merge with the after masthead light and therefore it will not be possible to distinguish with certainty what the vessel is doing.

For the majority of cases 1½ miles is too late to start altering course if a close-quarter situation is to be avoided, especially nowadays when there are more and more ships capable of 20 knots and over. To obey the collision regulations a vessel should sound the appropriate whistle signal when altering course but I think that most navigating officers will agree that whistle signals cannot be heard at much more than about half a mile. In practice, if the whistle is sounded it is taken to mean that the vessel is in a close-quarter situation and brings the captain to the bridge 'at the rush', and it is sometimes better, as a recent contributor suggested, to let sleeping captains lie! A more practical solution to the direction indication problem would be to use the Aldis lamp. This can be flashed the appropriate number of times (1 for starboard, 2 for port) and can be acknowledged by the other vessel flashing an agreed signal (possibly the International Code signal C affirmative).

Visual Signals for Manœuvre at Sea

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HAVING followed national and international shipping periodicals of the past years, one can readily observe that a signalling device installed on a vessel giving early and permanent signalling of the ship's course and manœuvre is urgently needed. In this report I will attempt to give brief information on previously known ideas, analyse them, draw conclusions and make a new proposal.

Practical navigation requires such a signalling device because of the ever increasing traffic density of sea areas and estuaries, and the high speed of modern vessels and the experience that a unique sound and visual indication of the *beginning* of a manoeuvre is not sufficient. For reasons of nautical safety, it is considered necessary to introduce a manoeuvre signalling system which indicates:

- (a) the intention to carry out a manoeuvre before the manoeuvre itself is started;
- (b) after the initiation of the manoeuvre that the vessel is engaged in performing the signalled manoeuvre.

To prove that a device of this kind is necessary, the following extracts are taken from German Federal Maritime Courts of Inquiry (Seeamtssprüche)

1. The accident is due to the fact that the m.v. M did not recognize as such the meeting m.v. A in time because of the failure of A's top light and that the course signals, *given in good time by both vessels, had not been heard by either party.*
2. The accident is attributed to the fact that while T was trying to overtake, a *misunderstanding of the signals exchanged* occurred and H did not give enough room to let T pass ahead.
3. The accident is due to the fact that W, with regard to the vessel ahead E, was forced to stop suddenly and sheer out of line to port. The accident showed *that sound signals alone are not sufficient to clear up difficult situations and that the simultaneous use of visual signals should be introduced.*
4. *The accident has been caused by a misunderstanding when signals were exchanged.*
5. The accident is due to the fact that A, *after apparently having sighted a visual port course signal of a meeting ship, prepared, and after emitting the visual port side passing signal, turned to port. Actually, P had not given the signal.*
6. The accident is due to the fact that the advisory pilot of V *misunderstood a sound signal of the drifting vessel N.*
7. The m.v. OP has collided with the t.v. S and foundered (one seaman met his death). Primarily, the accident is due to the fact that the helmsman of S *erroneously* steered to starboard. Furthermore, it was of some importance that, in the last minute, OP *had started an emergency turn with starboard rudder and full ahead*, because it was thought that the sound signal 1 short blast from the meeting vessel had been heard.
8. The commanding officer and advisory pilot of H having perceived a *presumed bunkering signal, erroneously supposed* that the meeting vessel would pass to starboard. *A collision was the result.*

Though the majority of these accidents occurred in the Kiel Canal, pilots and navigators are well aware of the fact that quite a number of near-collisions have occurred and still occur which were caused when their own decision was obstructed because they had no clear view of the changes of course and manoeuvres of other vessels.

A first step towards better signalling of ship manoeuvres was made in the International Regulations for Preventing Collisions at Sea, 1960, part E, *sound signals* for vessels in sight, rule 28, (c) which reads:

- c. Any whistle signal mentioned in this Rule may be further indicated by a visual signal consisting of a white light visible all round the horizon at a distance of at least 5 miles, and so devised that it will operate simultaneously and in conjunction with the whistle sounding mechanism and remain lighted and visible during the same period as the sound signal.

This facultative rule is not satisfactory, and involves the following disadvantages.

Due to the different time of arrival of the two signals, especially at greater distances, the signalling of synchronized visual and sonic signals may lead to misunderstanding of the intended manoeuvre as the above extracts, taken from the Maritime Court of Inquiry (Seeamtsprüch) obviously demonstrate. In particular, the identity of the signalling ship cannot easily be established.

In some waters, rivers and canals, Rule 28 (c) of the Collision Regulations certainly helps to avoid misunderstanding because of the generally small distances between the vessels. For that reason the following Rule 28 (4) in the Kiel Canal Traffic Regulations was introduced on 1 May 1967:

Any sound signal from a motor vessel of 12·20 m. or more, must be accompanied by a white light signal with a luminous range of at least 2 naut. miles all round the horizon, which must be emitted at the same instant as the whistle and remain visible for the duration of the whistle tone.

Inland-waterway vessels, instead of the white light signal, may emit visual signs by means of a steam cloud or a yellow shining light.

This regulation, based upon Rule 28 (c) of the International Collisions Regulations of 1960, principally, has the same disadvantages.

Therefore, we must study what the requirements are for a signalling device for signalling ship manoeuvres. They must include:

1. The device or installation must be of simple construction, safely operating, easy to handle and ready for use at any time.
2. The signals given must have a sufficient luminous range all round the horizon.
3. The signals positively must attract the attention and be easily comprehensible.
4. The signals must be such that they cannot be misread.

In our search for a signalling device which fulfills the above-stated requirements we must also ensure that it fully conforms with the Collision Regulations. In particular, the following Rule 1 (b) of the Collision Regulations of 1960 must be taken into consideration.

The Rules concerning lights shall be complied with in all weathers from sunset to sunrise, and during such times no other lights shall be exhibited, except such lights as cannot be mistaken for the prescribed lights or do not impair their visibility or distinctive character, or interfere with the keeping of a proper look-out.

In accordance with this, Rule 6 (2) of the German Inland Water Rules determines that:

Any light which is not prescribed or authorized under the mentioned denomination, has to be so screened that confusion and traffic blinding is avoided.

Knowing these regulations one has to examine whether signalling devices signalling ship manoeuvres offend the regulations, and whether the number of accidents or near-accidents caused by mistaken course signals require such a device at all. Of course, opinions on this question will be divided, but it is certain that Germany and other countries are studying signalling devices in order to make ship manoeuvres more perceivable and that the technical and public press are seriously concerned with this problem.

A number of signalling devices which propose the most varied arrangements of lights for signalling course changes have become known. One of these consists

of a swivelling frame fixed to a mast and bearing a number of radially arranged lights. For the purpose of emitting signals, the frame can be swung to port or starboard, the light arrangement being operated in conformity with an agreed code. To the middle of the frame a permanently burning control light (DRP 145 852) is fixed. Any such signalling installation is costly, liable to interference and also inefficiently arranged for the purpose of course-change signalling in all directions.

Another arrangement uses only two signal sights, which provide flashing light signals in different colours and sequences (DRP 81 144). However, this arrangement does not fully meet the requirements of low cost, easy comprehensibility and non-confusion.

In his specification No. 1 195 190, a German captain has conceived, as a patent claim for a signalling apparatus, an arrangement of flashing lights, characterized by the transmission of electric signal impulses into the position side lights and rear top light. The author has seriously attempted, in collaboration with the patent holder, to improve his conception, and has prepared a document which the Government of the Federal Republic of Germany has submitted to Imco. It has been dealt with by the sub-committee on Safety of Navigation, where it was declined as being incompatible with the International Collision Regulations. The opinion was that flash signalling through position lights or position reserve lights did not guarantee a clear and unmistakable signalling.

There is also a signalling arrangement called the 'visual direction indicator', which is being tested by some Dutch vessels. The indicator is fixed horizontally at the foremast above the crosstree. To each end, an arrow-point is fitted. To the shaft and to the arrow-point, freely supported electric circular lights (visibility 3-4 nautical miles) are fitted, which are operated from the bridge. The length of the arrow is 6-7 m. In order to signal a turning manoeuvre, the flashing light-arrow is operated 3 to 4 times shortly before, to draw the attention of other vessels towards the intended turning manoeuvre. This has mainly one disadvantage: the flashing arrow is distinctly visible only from other ships ahead, whereas from the side or from astern it can be misinterpreted.

There are other conceptions of the subject proposing a circular light fixed to the directional deck or any other suitable place on board, emitting flash signals when a change of course is intended. This arrangement, too, suffers from the above-mentioned disadvantages.

In an American periodical, I discovered an article covering the same subject under the heading 'synchronized light and sound signals'.

A better solution would be represented by a fixed, permanently repeated light signal, which could be produced by a flashing, rotating, coloured light with a special identification to indicate or attract the attention towards a particular manoeuvre. Such a rotating light signal, fixed to the rear crosstree and visible all round the horizon, could be used by day and night in addition to the required sound signal.

The following two extracts are taken from English shipping journals:

1. The synchronized light/sound signal is used by certain vessels on the River Thames, though mainly by small vessels such as tugs and towed vessels, which are such a feature of that waterway. In my opinion, however, bigger ships desire an additional signal. . . . I suggest that on these ships only a red and a green light on the level of the Morse lamp be installed. Approximately two minutes before a course change to port, the red light will be switched on and long light signals will be emitted (if to

starboard it has of course to be green). Immediately before steering towards the chosen direction, the long light signals will be transformed into short signals, and be entirely switched off as soon as the vessel is on its new course. Whether this signal, which dates from wartime, can be used in the open sea is another question. However, I recommend the use when going into a harbour.

2. The subject of most debates on manoeuvre signals is a 'trafficator'-signal, which signals a change of the course by night. The possibilities of this kind of signal are generally known, as periodicals are discussing the subject. At present, opinions differ on how this signalling device should be constructed. The two most frequently planned conceptions seem to be an illuminated arrow and some kind of flashing lights. The illuminated arrow has been appreciated in the Netherlands. It is the only 'trafficator'-signal which has been tested in practical use, but it has been reported that it suffers from various disadvantages.

Previous studies on how to solve the problem of a signalling device make clear, as the respective proposals show, that there has been no hesitation in the use of coloured lights, provided there is no risk of confusion. However, I have some doubts for following reasons.

We know that colour signals on board of other ships can lead to misunderstanding even on the open sea, either on passenger ships with decorative lights, or on other ships, where the red light from a cabin situated on the starboard side of the ship shows in misty or dense weather. On the waterways, any imaginable combination has been put into use, so that navigation should not be obstructed by additional coloured lights on vessels whatsoever their purpose may be. This seems to be in order, because the safety of the vessels is at stake. Preference should be given to a signalling apparatus, conceived in accordance with the above-mentioned requirements, using white or yellow light for signalling purposes, instead of coloured lights.

The question of the practical usage of a signalling installation, as to its effect and visibility, must be made part of the study. Practical experience has shown that the white/yellow light of the emitted visual sound signals has proved sufficiently visible by day. It goes without saying that, by night, lights can be seen much clearer and further than by day. As proved by the statistics (Table I) of marine casualties dealt with by German Maritime Courts of Inquiry (Seeamt) collisions occur more frequently by night than by day. Perhaps in this field, too, a reliable signalling device signalling ship manoeuvres would help to reduce the number of collisions.

TABLE I. MARINE CASUALTIES OF GERMAN VESSELS (IN PERCENTAGES)

Year	Darkness	Daylight	Fog	Low visibility
1962	39	31	13	17
1963	36	26	26	12
1965	34	29	24	13
1966	43	19	27	11

Any objective analysis of the existing proposals for signalling devices which signal course and manoeuvres will probably result in the conclusion that they all have more or less disadvantages from the technical point of view, and that, on some

points, they will not be in conformity with the International Regulations for Preventing Collisions at Sea, or the German Inland Water Rules.

However, this should not prevent us from trying to find a solution to the problem. On the contrary, if it is possible to carry through any practical tests and if any of the tested signalling devices qualifies, the results should be examined closely as to whether they can serve the navigator as a new means of navigational aid and thereby increase the general safety at sea. As the Maritime Safety Committee has already thoroughly dealt with the question, any positive results should be reported to Imco and proposals amending Rule 28 of the International Regulations for Preventing Collisions at Sea should be submitted to that organization.

A proposed installation. The following system appears to offer the advantages sought. It consists of two additional lights:

- (a) Above the second masthead-light (or if there is only one masthead-light, then above this one) at a vertical distance of 1.83 m. a second top light as a signal light.
- (b) Above the stern light at a vertical distance of 1.83 m. a second stern light as a signal light.

On the navigation bridge (or control platform) a signal-giving device should be provided which continuously transmits the course signals as light signals to the signalling lights. The course signal is operated when the manoeuvre begins and has to be switched off as soon as the ship is following its new course. Switching is hand-operated (as in a car).

A sternway manoeuvre can be automatically transmitted into the signal lights as 3 shorts by contact-breaking on the engine telegraph. On vessels, which are equipped with a manoeuvre printer, the emission of a signal can be automatically registered at clock time. The location of the described signal lights refers to a reference direction of the keel-line and the position lights of the vessel. This principle has been applied to the location of the customs lamp on vessels navigating on the German waterways. This makes a confusion with other lights on board or with light identifications, which are sent from beacons or light buoys in pilotage waters, almost impossible.

REFERENCES

- ¹ *United States Coast Guard Proceedings*, 24, 9. 1967.
- ² *This Journal*, 19, 394.
- ³ *Hansa* No. 23, 24/63 No. 14/65.

A Navigational Glossary

In a pungent note published in the October 1966 *Journal* (Bad Language, *Journal*, 19, 523), Wing Commander E. W. Anderson drew attention to some of the confusion that had arisen through lack of a precise and accepted navigational terminology. He suggested that if a number of the more contentious terms were defined and accepted by the Institutes of Navigation, the use of 'bad language'