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STANDARD ROAD SIGNS AND SIGNALS
IN WEST AFRICA

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Annex

Specimen manual of road signs, signals and markings.

STANDARD ROAD SIGNS AND SIGNALS IN WEST AFRICA

1. Recommendations by the United Nations on uniform road signs and signals

1. The present note has been prepared pursuant to that part of resolution 32 (III), adopted on 16 February 1961 at the third session of the Economic Commission for Africa, whereby countries of the West African sub-region are requested to study the possibility of standardizing their road traffic signs and signals. It is assumed here that, when making this request, the Commission had in mind earlier United Nations activities at world level in this field.
2. The question of establishing a standard system of road signs and signals in West Africa may, in fact, well be regarded as an aspect of these activities, which were rendered essential by the unsatisfactory results achieved through international consultations on the elaboration and maintenance of a uniform system and other related matters which had gone on ever since the development of road networks for motor traffic requirements became a significant factor in the economic life of countries.
3. The United Nations contribution consisted in preparing a draft international agreement, which came to be known as the draft 1953 (New York) Protocol on a Uniform System of Road Signs and Signals^{1/}, whose provisions specify all the essential elements which should be incorporated in the existing systems in order to re-establish uniformity of definition, design and use of the older and more common devices and at the same time to prevent divergent practices in the use of the more modern ones. The more traditional devices are road signs, by far the most frequently used to warn, regulate and guide traffic. It is precisely with regard to road signs that two principal

^{1/} For a full report on the draft Protocol see document E/CN.2/119 Final Report Submitted by the Group of Experts on Road Signs and Signals to the sixth Session of the Transport and Communications Commission.

systems, and variants of them, now exist and are widely followed. The differences in the more recent devices (such as signals, markings) are much less significant.

4. Pursuant to the draft 1953 Protocol, the Economic and Social Council in 1953-55 adopted a series of resolutions whereby a foundation was laid for the establishment of world-wide uniformity. The Council invited governments to take practical steps towards the progressive adoption, unilaterally and through regional cooperation, of the technical provisions of the draft 1953 Protocol. The response throughout the world has been encouraging ^{2/} and indications are that the tendency for the various systems to drift apart has been arrested.

2. Actual problems involved in standardizing road signs and signals

5. The two different systems of road signs and signals were developed independently of each other, with a number of variations in each. They are commonly referred to as the "European" or "International" system and the "American" system.

6. The most complete version of the "European" system is contained in the 1949 (Geneva) Protocol on Road Signs and Signals ^{3/}, which is a revised version of the system embodied in the 1931 Convention concerning the Unification of Road Signals. The later system was itself developed from a very simple one, namely that contained in the 1926 Convention on Road Traffic.

^{2/} See reports by the Secretary-General on a uniform system of road signs and signals to the Transport and Communications Commission, docs. E/CN.2/190 paragraphs 40-44, E/CN.2/174 and E/CN.2/151 and Add.1.

^{3/} The text of this Protocol will be found on pp. 75-144 of United Nations Publications Sales No. 1950. VIII.2., United Nations Conference on Road and Motor Transport: Final Act and Related Documents.

7. The "American" system is presented in detail in the Manual of Uniform Control Devices for Streets and Highways ^{4/}, which was prepared in the United States of America under the authority of the following three organizations: The American Association of State Highways Officials, the Institute of Traffic Engineers and the National Conference on Street and Highway Safety. The Manual is kept up-to-date by periodic revisions.

8. Even a cursory comparison of the two systems shows that they provide for three roughly corresponding categories of road signs: danger warning signs, signs giving definite instructions and (mandatory signs) and informative signs. There are differences in the shapes and colours used for the various categories; but the main divergence is that, while the distinctive feature of the European system is the systematic use of symbols for the sign message, the American system (though using symbols in some cases) relies on inscriptions. The characteristics of the traffic signals and road markings used in both systems are on the whole comparable, showing no radically contradictory principles.

9. Unlike both the 1949 Protocol on Road Signs and Signals and the U.S. Manual on Uniform Control Devices for Streets and Highways, the draft 1953 Protocol contains no set of technical provisions complete enough to be readily followed in drafting a manual, instructions or regulations on road signs and signals. This is due to the fact that its original purpose was to establish minimum common characteristics for incorporation in systems already in universal use. It is nevertheless desirable that these characteristics be introduced into the newly developing standard set of road signs and signals for West Africa. The clear statement in the Protocol of all important elements of uniformity does provide a powerful tool and, if not a guarantee, then at least a reasonable hope that a system based thereon will be suitable for and acceptable among participating countries in West Africa. The Protocol may also at the same time represent a contribution to the development of uniformity throughout Africa, thereby, as it were, anticipating its place within a uniform system for the continent.

^{4/} This document is not available as a United Nations publication. However, the Secretariat will endeavour to have copies available for consultation.

3. Basic requirements for a uniform system

10. The authorities of the West African countries are no doubt well aware that road signs and signals are becoming increasingly necessary as a means of advising road users on traffic requirements or conditions at given places and times, with a view to preventing accidents and to regulating and guiding motor traffic. Considering the great value of adequate, but not excessive, use of the devices and aids their selection, placement, application and operation should be governed by technical norms and regulations; for their unregulated use may have the opposite effect from that intended, resulting in delays or confusion or, as happens fairly often, in total disregard of them.

11. It is therefore important to realize that road signs and signals fall into separate categories, depending on the situation of which the road user is to be apprised:

- a) Danger warning devices, which call attention to potentially dangerous conditions;
- b) Mandatory signs, giving the road user notice of traffic regulations applicable to a given place, road or street;
- c) Informative signs, for route designations, destinations, directions, distances, and other general information.

Traffic authorities should consistently observe this functional subdivision, as it induces road users to respect and rely on road signs and signals.

12. Every road traffic control device should meet the following requirements:

- a) Compel the attention of the road user to whom it is directed;
- b) Convey its meaning in a simple, clear and rapid way;
- c) Allow adequate time for the required response;
- d) Command the road user's respect.

Whenever a device fails to meet any of these requirements, its value to the road user is impaired. It might even become entirely ineffective.

13. Compliance with these basic requirements is normally assured by strict uniformity in application and uses. In the ideal, a given device should always have the same meaning and be used for the same purpose in the same relative position, so that the road users to whom it is directed develop the proper response as a matter of habit.

14. Another principal factor is the design of the device, whose target value depends on suitable use of shape, size and colour combination for visibility and comprehension of the message at a distance. All these features should be so balanced as to give the impression of being "official" and a logical part of the road or street.

15. Finally, the position of the device within the normal line of vision of the road user is of great importance in meeting the above-mentioned requirements; devices which require shifting of the driver's eyes or head demand more time for comprehension and response. The device should also be placed so that there can be no doubt regarding which traffic stream or class of road user it applies to.

16. In conclusion, the warning, regulation or information which a sign, marking or signal is intended to convey must strike the road user as useful and reasonable. With growing experience of the reliability of signs for safeguarding, facilitating and expediting traffic, he learns to respect them more and more. Respect, in other words, grows out of proper use. This point should be borne in mind when the problem of standardization for the region is tackled. In the sections that follow attention is directed to the techniques indicated below:

1. Road signs;
2. Traffic light signals;
3. Road markings;
4. Manual signals.

4. Road signs

17. The effectiveness of road signs largely depends on the attention they command, relative to their functional class (danger warning signs, mandatory signs, informative signs), on legibility (which is ensured by distinctive shape, colours and message) and on suitable placement to provide adequate time for response. Uniformity of use is therefore an overriding requirement. To ensure this, road signs are installed under the authority of a public body or officials with appropriate jurisdiction. Even when a local authority is competent to install signs within its area (township, rural highway maintenance, port authority, etc.), it must follow the standards and rules laid down by the national authority. In special cases, e.g. if it develops a new sign or other device, it must request prior approval from the national authority.

18. Signs are usually placed at right angles to the side of the road nearer the user for whom they are intended. They should stand out from their background and from surrounding objects. Since, of course, everything must be done to safeguard the prominence of road signs and their distinctive colour and shape, a strict watch must also be kept over roadside commercial hoardings and advertising displays, which may impair the value of road signs if placed in their proximity. This factor is important to remember, because authorities sometimes permit advertising displays on the reverse side of sign plates or on additional plates in order to raise funds for the erection or maintenance of the signs. This practice has on the whole been proved to be undesirable, as it is difficult to ensure that the advertisement will not detract from the message of the sign.

19. Ideally, signs required for night traffic (some mandatory signs are not necessary at night because the regulation, restriction or prohibition does not apply) should be as visible and comprehensible by night as by day. Some countries require illumination or reflectorization (by means of cat's-eyes or reflectorized paints). However, care must be taken to ensure that the material used does not produce dazzle or that the message does not dissolve against the bright ground of the sign. Among signs that are as

necessary by night as by day are practically all danger warning signs, stop signs, those indicating obstructions on or near the carriage-way and direction signs in busy areas. Illumination is obtained from exterior lighting, flood lighting or lighting inside a translucent-faced sign. In reflectorization, the principle used is that of returning to the eyes of the driver a portion of the light from the vehicle's head-lamps; reflectorized paints contain miniature reflex reflectors which return light towards its source and are brightest when seen from a point at or near that source.

Shapes, colours and symbols of signs

20. The various road sign systems of the world differ particularly as to shapes, colours, symbols and sizes. In this respect, the value of the draft 1953 Protocol lies in the provisions it contains for the standardization of these features; hence the main value of the Protocol for the introduction of a standard system in West Africa lies in the design characteristics of the various categories of signs referred to above.

21. Danger warning signs would be standardized by:

- (i) Shape : a diamond (i.e. a square with one diagonal vertical) or, since this is not widely accepted in the region, an equilateral triangle.
- (ii) Colour : light yellow ground with black (or dark blue) border and sign message (whether symbol or inscription). The practice in the region is to use a red border. If this practice is accepted, then the border should be very narrow to enable the size of the sign message to be increased.
- (iii) Size : Diamond signs would have a side of 60 cm. (24 inches), triangular signs a side of 90 cm. (36 inches);
- (iv) Symbols : A symbol rather than a word message would convey the particular warning.

22. Mandatory signs :

- (i) Shape : Round (although some exceptions should be allowed for in the case of traffic regulation signs at intersections and a few others).
- (ii) Colour : White ground with red border, black (or dark blue) symbol.
- (iii) Size : Diameter of disc not less than 25 cm. (10 inches) or more than 40 cm. (16 inches).
- (iv) Symbols : As with danger warning signs, symbols would be used to convey the mandatory instruction.
- (v) Word messages : In some cases these may be deemed necessary in order to convey the regulations adequately; but, when used, they should be as brief as possible.

23. Informative signs form a large class requiring subdivision into groups by shape and colour. Sizes and sign messages must be decided with special attention in each case to the purpose of the sign and its relative importance to traffic. The rectangular shape is usually reserved for this category, with either (i) colour combinations of white or light yellow ground and black or dark blue message and border, or (ii) these colours reversed (dark blue or black for ground and white or light yellow for message).

5. Traffic light signals

24. The term "traffic light signals" refers to the group of mechanical and devices developed for the regulation of vehicular and pedestrian traffic at busy intersections. The signals are given by means of powerful red, amber or green lights, which may be either steady or intermittent. The need for and use of these devices, especially in the congested urban areas of the West African countries, is likely to grow considerably in view of their value (i) in reducing the possibility of accidents and (ii) in moving traffic across intersections in an orderly, co-ordinated fashion.

25. The mandatory meaning of signal messages given by a steady light beam has been defined as follows: Red "stop" light prohibits crossing the intersection; amber light allows movement across intersection if that is possible before the light changes; green "go" signal permits passage through the intersection. The meanings of these signals change when the light is intermittent or flashing: Intermittent red requires momentary stop before entering the intersection; intermittent amber means "caution". Other modifications may be established by means of green-arrow signals or word messages for pedestrians. In addition, two important variants should be noted: the double flashing red light of railway level-crossing "stop" signals and the simultaneous red and green light used in systems which have no amber light.

26. Traffic light signals may be classified by their uses as follows:

- (i) Traffic signals for street intersections;
- (ii) Pedestrian traffic signals;
- (iii) Beacons and flashing signals for street and road junctions;
- (iv) Lane direction signals;
- (v) Train approach signals.

In any of these classes the basic design characteristics are comparable, if not the same, since they are derived from the common basic requirement of compelling maximum attention.

27. Lenses of signals must be not less than 20 cm. in diameter and lighted by 40 - 100 watt lamps with reflectors. The housing of the signals should be dark in colour (green or black), although the posts have sometimes to be painted in white (or yellow) and black stripes for added attention value or if they constitute an obstacle in the carriageway. The location and the repetition of signals depend on the density of traffic and on the limits of the users' field of vision. The height of signal faces is normally 2.40 - 3.0 m.

(ii) The attention of the driver should be attracted by the signal faces. The signal faces should be of a size which is easily visible from a distance of 100 m. The signal faces should be of a size which is easily visible from a distance of 100 m.

28. Street traffic signals are usually of the three-colour system (red - amber-green), less frequently of the two-colour (red-green) system. The positioning of the colours has been standardized, preference being given to a vertical arrangement, with red at the top. When the horizontal arrangement is used, red is on the left-hand side of the group. The standardized relative vertical or horizontal position of the lights in the signal assembly is designed to draw maximum attention to the red signal, and it also helps colour blind persons.

29. Traffic signals may be manually operated but are now usually automatic, the two principal automatic types being fixed-time and traffic-actuated signals. With the former it is necessary to determine the period of time to be apportioned to each crossing traffic flow. The selection and arrangement of simultaneous flows is known as phasing, the purpose of which is to accommodate all traffic safely and with minimum delay, the complete sequence of "phases" constituting the "cycle of operation".

30. As the desirable signal-cycle division and duration are based on existing traffic demands at the approaches to the intersection, the fixed-time type of equipment lacks flexibility in meeting sudden variations in traffic, because its cycle length and division are pre-determined. But it is less expensive and readily adaptable to co-ordination in systems and networks. With a view to mitigating the lack of flexibility, more recent fixed-time equipment is so constructed as to permit changes in cycle characteristics on a pre-determined schedule.

31. The traffic-actuated control signals are the more recently developed and more expensive. Their main functional characteristic is the automatic response and adjustment to variations in traffic flow and even to the momentary surges which are inherent in traffic demand. The traffic demand is registered through detectors placed in the carriageway at suitable places in advance of the signals (push-buttons being provided for pedestrians, where necessary) and in accordance with registered demand the timing mechanism (within limits) directs the division and duration of the cycle automatically. Exclusively traffic-actuated signals are indicated for complicated intersections.

32. If changes in the flow of traffic along streets are effected by traffic signals, adjacent signals must be co-ordinated. Coordination may be achieved by operating two or more signalized intersections as a system providing suitable accommodation for traffic passing the successive intersections. The co-ordination of signals need not cover a single route only; two or more routes may be combined to produce a signal network.

33. Considerations of installation and maintenance costs will influence the decision as to when traffic light signals are warranted and which type should be selected. As a general rule it may be stated that most intersections with or without traffic lanes, require signals when the volume of traffic approaches their capacity. The capacities of signalized intersections are obtained by empirical methods. It has been found that under ideal traffic conditions a possible capacity per hour of green light signal per traffic lane would be 1250-1500 passenger cars.

6. Road markings

34. Road markings have been developed principally to meet the needs of motor traffic. They are specialized types of traffic signs applied to the road surface, to ancillary road features, such as kerbs, guard-rails or posts, or to structures erected by the roadside. They may take the form of lines, patterns, symbols, word messages. Materials used are embedded strips, studs, delineators or, most frequently, paint. On unlighted roads and streets the use of reflectorized paints, studs or delineators may often be warranted.

As in the case of road signs, road markings may be used for warning, regulating or directing the traffic. They serve either to define locations to which the warnings apply or regulations indicated by road signs or signals or as sole traffic control devices.

35. The category of the marking (warning of danger, mandatory or informative) may be indicated by the signs or signals in conjunction with which it is used or, in their absence, by a conventional meaning assigned to its colours (white, yellow, red) or its appearance (continuous, broken, double line). Because of their position, road markings are in the normal field of vision of motor vehicle drivers. To ensure their effectiveness, it is important to select suitable contrasting materials for the markings and design them with due attention to the road user's line and limits of vision.

36. Road marking technique does not call for a mass of regulatory measures. These can be quite simple and brief. The greatest needs are rather discipline on the part of road users and proper development and observance of traffic engineering standards. Since the latter are set out in domestic technical instructions or reference manuals for the use of highways officials, the best basis on which to frame them and keep them up to date is international exchanges of information on research accomplished in this field.

37. Longitudinal markings, consisting of continuous and broken lines, are those used to delimit traffic lanes, to divide streams of traffic moving in opposite directions, and to regulate no-passing zones and obligatory traffic flow. Vehicles are allowed to cross broken lines, provided that this can be done safely and that traffic rules are respected. A continuous line may not be crossed. Where a continuous line is used adjacent to a broken line, the dual line has the meaning of the line nearer the traffic, and the continuous line may be crossed by the traffic to whose side the broken line is nearest. The width of lines is 10 - 15 cm. In the spacing of broken lines account is taken of the speed of vehicles on the road concerned, the length of stripes and gaps varying from 2 to 10 m.

38. Transverse markings are lines placed across the path of traffic either to draw attention to other signs or signals or as traffic control devices by themselves. The principal markings of this category are stop lines (at street or road junctions, or railway level-crossings, or pedestrian or cyclist crossings). Other markings used are arrow signs for turns, danger warning symbols (for level-crossings or reduced width of carriageway), word message

(stop, bus, taxi, direction indication etc.). In the design of all these markings, their height is emphasized, to take account of the angle at which they are seen by drivers.

39. Among other road markings are those used to indicate (by means of oblique parallel stripes) areas of the road which should not be entered, to indicate parking limits (by lines on the pavement) or to indicate parking restrictions (by kerb markings). The markings of stop barriers, or of structures adjacent to the roadway, by oblique parallel stripes designed to enhance their visibility also falls into this category.

40. The colours for markings should be selected for maximum contrast, white or yellow being preferable. Colour may also be used to convey a meaning. Thus, when both yellow and white are employed, yellow often has a mandatory meanings; for example, continuous longitudinal lines which must not be crossed and lines indicating a parking or stopping restriction are yellow.

7. Manual signals

41. Hand signals, to be meaningful and effective, must be simple and should be performed energetically and in a decisive manner. This applies equally to signals by drivers indicating their intended movements and to those by police directing the traffic. It is interesting to note that, while almost all countries' domestic regulations contain provisions on signals by drivers, many do not mention signals by police, whereas existing international agreements provide only for the latter.

42. Mechanical signalling devices have lessened the need for manual signals, but in the case of light traffic and for economic reasons they should not be discarded completely. Owing to the decreased emphasis on manual signals, and notwithstanding their simplicity, they vary substantially from region to region.

43. The following drivers' signals are those most frequently used (where the right-hand traffic rule applies): straight horizontal extension of the arm means left turn; forearm bent at elbow, hand pointing upwards, right turn; arm extended downwards, stop or sharp reduction in speed; forward giratory motion of the arm extended downwards, signal of free way to overtaking vehicle.

44. Traffic police hand signals are regulatory in character; more specifically they convey compulsory order: "caution", "go", "turn", "slow", "proceed." For conveying their meaning they must depend primarily on the clarity with which they are executed. Certain attention-compelling features can be supplied by means of special equipment; but their effectiveness is secondary. The equipment may include contrasting colour or reflectorized gauntlets, helmets, batons, raised stands etc. There are few universally accepted signals. The one for stopping traffic has as its element of world-wide uniformity the up-raised hand with fingers vertical, palm open towards the line of the traffic that is to stop. Other elements of this signal, as of other signals, may differ from region to region, or even from country to country within a region.

8. Conclusion

45. In West Africa, two or three variants of the European system of signs are followed, although at least a few signs of the American system have also been introduced. With regard to traffic light signals, both two-light and three-light systems are known. As to road markings, in urban areas there have been introduced delimitation lines for parking (or no-parking), centre lines and stop lines. Much attention seems to have been paid, at least in some countries, to proper methods of hand-signalling by traffic police.

46. Hardly any country of the region has as yet a well-developed system of road signs and signals, mainly because there has been no opportunity to accumulate the necessary experience or funds enough, to undertake the required research, but partly also because no satisfactory inexpensive solution to the region's road traffic problems is to be found in the over-detailed regulations of, or studies made in, European or American countries.

47. As a guide to the search for a uniform West African system, the Annex to this note contains a set of such draft provisions on road signs and signals, traffic light signals and road markings as have been considered, or are under consideration, for regional action in Asia and the Far East, or in Latin America. In those regions, the preparation of draft recommended provisions was designed to provide a sufficiently complete study as a basis for joint decision on uniform standards by specialists from the different countries, representing national authorities responsible for road construction and maintenance, motor vehicle administrations and traffic police. The uniform standards decided upon were to be recommended to governments for adoption, whether by voluntary individual acceptance, or through formal regional agreements.

48. It is not suggested, however, that the same course be followed in West Africa as in the ECAFE and ECLA region. The special conditions prevailing in the countries of West Africa seem to warrant consideration of a different type-action and attention to additional relatively important aspects of the question. While the task of developing standard road signs and signals is a short-term project, the problem calls for continued activity in research, technical service and administration, and for periodic expenditure on equipment, renewals and maintenance. Countries of other regions probably have comparatively more facilities and more accumulated experience at their disposal to ensure the implementation of any agreements they may conclude than can be expected in West Africa.

49. Accordingly, the present study of road signs and signals leads to the observation that, while the authorities are at present no doubt deeply interested in being able to propose for adoption in their respective countries a modern method of road signalling, they are primarily desirous of setting up or reorganizing, as the case may be, an efficient technical service in each country which can be entrusted with the preparatory work and subsequently assume responsibility for all related activities of a permanent character. This situation is similar to that believed to arise in connexion with various other road traffic development questions, dealt with in greater detail in part VII of the Note "Possibilities of Standardization of Road Motor Vehicle Legislation in West Africa," where it is suggested that a more rapid advance and more lasting results could be achieved through a determined effort to pool resources - both those that countries have available in their technical road traffic services and those that could be obtained through international co-operation programmes. As to the form such as "pool" might take, it is suggested that it may be desirable to establish a regional road traffic institute, which would of course be competent to act in the field of road signs and signals.

50. Specifically, the Institute would be requested, as a priority project, to prepare reports on the present situation in interested countries and on the adoption of a uniform system of signs and signals. Thereafter it would advise, where required, on any new regulation and, in particular, provide technical guidance in the field, contributing studies of special cases and training technicians for both urban traffic engineering projects and rural road signs improvement projects. The institute would also promote adequate liaison between trained technicians from the various countries and the competent international association and organizations.