

CURRENT STATUS OF TURTLE EXCLUDER DEVICE (TED) IN SHRIMP TRAWL NETS IN NIGERIA***BOLAJI, D. A., SOLARIN, B. B., AKINNIBAGBE, R., FAKAYODE, O. S., KAYODE, K., OBIENU, J. & AKANDE, T.**

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Abstract

A two-man team of USA Scientists/Experts permitted by the USA Congress to carry out a thorough inspection of TEDs in shrimp trawl nets in Nigeria as a pre-condition for recertification of Nigeria; for shrimp's exports mainly to EU and USA markets. The inspection took place in August 2013 and August 2015 for a week each. A total of 196 TEDs were inspected in 49 vessels in 2013 and 27 in 2015 from 5 shrimping companies. Two types of TED grids were predominant in the Nigerian Inshore shrimp trawlers namely Weedless and Super Shooter/ Bent Rod which were constructed in 3 different sizes 86.4cm x 86.4cm (59%), 91.4cm x 101.6cm (33%) and 106.7cm x 127.0cm 8%. About 39% of the trawl nets were installed lower than 40° while 61% were between the recommended angles of 45° – 55°. Escape opening recorded minimum of 180 cm (71") horizontal or minimum circumference of 360 cm (142"). The Nigerian shrimping industry was rate at 63.3% which has been adjudged to be one of the highest in the world and second only to Mexico and 90% in 2015 with 100% installation of double cover flap for fast exclusion of endanger sea turtle.

Keywords: TED Compliance, Shrimp Trawling, Grid Sizes, Double flap cover and Codend Extension.**Introduction**

The Nigerian Industrial fisheries sector is dominated with inshore demersal trawlers, operating mainly in the narrow continental shelf up to a maximum of 50m depths for finfish and shellfish (Longhurst 1964, 1965; Bayagbona 1965, Kusemiju 1975, 1991; Dublin-Green and Tobor 1992; Ogbona 2001; Solarin *et al.*, 2011). Shrimps catch and exports to EU and USA markets which earn foreign currency at an average of USA\$50 million from the mainstay of the fishing/shrimping industry in Nigeria, without which the industry would have collapsed completely.

Section 609 of USA Public Law 101-162 of 1996 provides that shrimps or shrimp products harvested with commercial fishing technology that may adversely affect certain species of sea turtles protected under US laws and regulations may not be imported into USA unless there is confirmation and certification (on annual basis) on Turtle Excluder Device (TED) compliance as well as other substantial evidence on sea turtle conservation. In accordance with the above, USA recognizes Nigeria as one of the 13 countries world-wide, that have TED regulatory program governing the incidental capture of sea turtles in commercial shrimp trawling. TED regulations have been domesticated accordingly in Sea Fisheries Regulation No 1 of 1st August 2006 and a high degree of compliance has been maintained with the collaboration of all the stakeholders including Managers/ Administrators, Researchers/Scientists and the Fishing Industry. Monitoring, Control and Surveillance Unit of the Federal Department of Fisheries has being in the vanguard of administering strict penalties for contravention of the regulations including imposition of fine to operators, confiscation of nets, blacklisting

of the captain as well as withdrawal or outright refusal of vessel's license. TED inspection is carried out on yearly basis to ascertain the level of compliance by the Nigerian inshore shrimp trawlers.

Materials and Methods

A 2-man team of USA Scientists/Experts, with the permission of the US Congress, carried out a thorough inspection of TEDs in shrimp trawl nets in Nigeria as a pre-condition for recertification of Nigeria for shrimp's exports. The inspection took place between August 2013 and 2015 for a week each, under the auspices of Federal Department of Fisheries (FDF) in collaboration with the Nigerian Institute for Oceanography and Marine Research (NIOMR). Physical measurement of covered aspects of codend extension (CE), grid type, size and bar spacing, grid angle of inclination, size of escape opening, size and knot orientation of flap cover as well as floatation were carried out according to Udolisa and Solarin (1982) using Keson Fiber Glass Meter tape model OTR10M50 and Neiko Digital Vernier Caliper/Micrometer Gage, Model: JEW95VC150 was used to the nearest cm and mm respectively. A digital angle meter Pittsburgh Digital Angle Gauge, Model 95998 was used determine angle of TED grid installation and J-hook net separator. A total of 77 trawlers were scheduled for inspection 50 trawlers out of a total of 122 shrimp trawlers registered by FDF in 2013 and 27 in 2015 due to lack of jetty space to accommodate the entire trawling fleets.

Results

A total of 304 TEDs were inspected across the 2 years in 76 vessels; 196 TEDs in 2013 from 49 vessels and 108 TEDs in 2015 from 27 vessels industrial inshore shrimp trawlers with double out triggered towing twin trawl nets. Two types of TED grids were predominant in the Nigerian Inshore shrimp trawlers namely Weedless and Super shooter or Bent Rod which were constructed in 3 different sizes i.e. 86.4cm x 86.4cm, 91.4cm x 101.6cm and 106.7cm x 127.0cm with percentage composition of 59%, 33% and 8% respectively as shown in Fig. 1. Maximum bar spacing recorded was 102mm (4ins).

Three TED angles of installations were observed those that are less than 35°, 35°- 40° and 40° - 45° with 7%, 32% and 61% respectively as shown in Fig.2. About 39% of the trawl nets used in the Nigerian Inshore Shrimp vessel had TED angle lower than 40° while 61% were between the recommended angles of 45° - 55°. Escape opening recorded minimum of 180 cm (71 ins) horizontal or minimum circumference of 360 cm (142 ins) and during measurement of a flap cover (Plate 1).

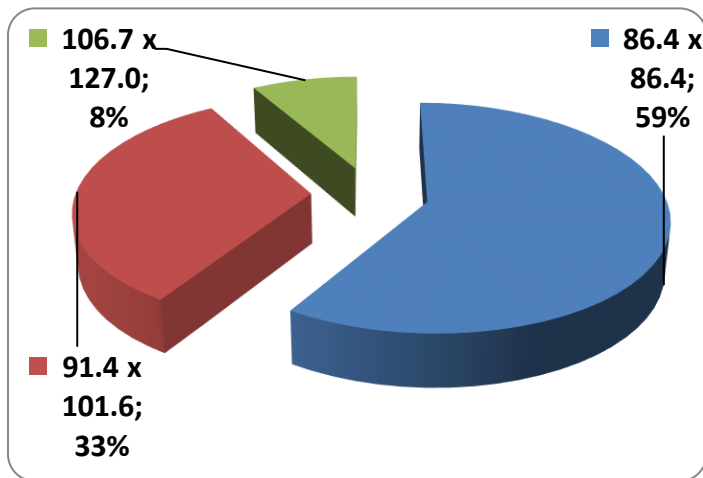


Fig. 1: Percentage of grid sizes used in Nigerian Shrimp Trawl nets.

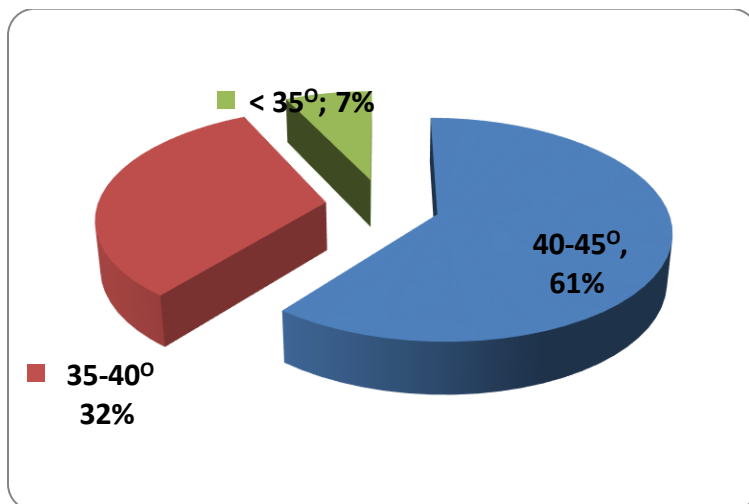


Fig. 2: TED grid angles of inclination in Nigerian Shrimp trawl nets.



Plate 1: During measurement of single flap cover.

The entire flap cover observed in 2013 was single cover but 100% usage of double flap cover was observed in the industry in 2015.

Discussion

The 304 TEDs were distributed among the 5 shrimping Companies including Atlantic Shrimpers Ltd, ORC, Barnaly, Sea Gold/Sea Bless and Karflex Fisheries Limited. Despite hitch encountered during 2013 survey when one trawler was hijacked on her way to the port, the compliance level of TED recorded in Nigerian Inshore Shrimp trawlers was observed to be very high across the 2 years. All the surveyed vessel had TED installed on all the four trawl nets towed by out triggers. There are six basic designs of hard TED grids used by trawlers as indicated by Mitchell *et al.*, 1995. Out of these, only 2 types of hard grid TED were observed to be predominant in Nigerian Inshore Shrimp vessels namely Weedless and Super Shooter / Bent Rod as reported by Solarin *et al.*, 2011. Adoption of the 2 types of grid can be attributed to simplicity and easy of construction.

The entire TED grid sizes used in the industry are legal and were larger than the minimum recommended size of 81.3cm x 81.3cm (32" x 32") Eayrs (2007) who recommend relatively large grid size because it gives more space for shrimps to enter the codend when very large specimen of the sea turtle are encountered.

Several authors Mitchell *et al.*, (1995), Eayrs (2007) Solarin *et al.*, (2005) and Solarin *et al.*, (2011) identified the angle of installation of the grid as an essential part for efficient exclusion of the sea turtle, large fishes and debris including floating tires and large plastics. Mitchell *et al.*, (1995) and Solarin *et al.*, (2011) recommended an angle of installation of TED grid to be 45° - 55° for maximum efficiency.

The lower TED grid angle of less than 45° which was observed in about 39% of the TED

installed can be associated to high shrimp loss because the flap cover did not close adequately while higher TED grid angle more than 55° also resulted in clogging of the grid and low shrimp catches and impaired sea turtle escape. The observed 39% is an indication that there is high loss of shrimps in 2013 exploration in Nigerian Industrial inshore fishery but as been corrected as observed during the 2015 inspection and introduction of rib line to keep the angle in place in case of impact on hard surface during trawl which were intervention from USA expert and Nigerian Institute for Oceanography and Marine Research.

All the TED cover on the trawl nets used in Nigerian Inshore Shrimp vessel had single cover as at 2013 which can slow down the exclusion of sea turtle from the trawl net as compared to double covers which is currently installed on all the trawl by 2015 which will aids exclusion of larger turtle and fast closure of the cover which prevent shrimp loss.

Despite all the technical challenges observed in the TED used in Nigerian Inshore shrimp vessels, the TED specifications which included codend extension (140-160 circumference meshes by 60 meshes), bar spacing (102 mm/4" Maximum), grid angle (mainly above 40°), size of escape opening, size and knot orientation of the flap covers as well as floatation. Indicated that the compliance level, as compiled by the USA scientists/inspectors, was rated at 63.3% overall in 2013 which has been adjudged to be one of the highest world-wide and second to Mexico which recorded the highest in 2013 and 90% compliance in 2015 which might gradually be taken over Mexico. Consequently, the inspection earned Nigeria recertification for exports of shrimps to USA

and EU countries on the 2 consecutive inspection years.

In other to improve the performance of the industry in area of shrimp production the following suggestions are provide; increase in grid size, construction and sea trial of flat bar grid with

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