Work Protocols and Sampling Strategies for Pole and Line

IOTC ROS SFO TR16.4

Category: Sampling strategies as a function of the IOTC fishery

[IOTC ROS SFO TR16]

This module aims to familiarize Observers with work protocols, sampling requirements, procedures and methods to be used in the collection of scientific fisheries data with the industrial tuna purse-seine fishery as these will be used daily in their routine work.

Trainee performance is to be evaluated against IOTC ROS competency standards:

- **Capable of collecting and estimating catch weight, volumes and ratios according to ROS standard procedures.**

The achieving of these standards is demonstrated by candidate capacity to:

- **Correctly select work protocols and sampling strategies to use with tuna and the bait fishing.**

- **Correctly estimate weights, volumes and ratios with the pole and line vessels.**

- Pole-and-line fishing is a simple fishing technique based on the use of poles to catch tuna one-by-one and the use of live baitfish scattered onto the surface of the water, to create a feeding frenzy.

- Poling fish is a rapid and active event with some crew chumming and the remaining crew individually poling fish out of the water.

- Observers on-board pole and line vessels are required to estimate tuna and bait fish fishing event catch per species, and to conduct detailed biometric sampling of both tuna and bait fish species caught.

- Normally, only one observer is deployed at a time on a pole and line vessel and its extremely difficult and dangerous for a single observer to conduct accurate and comprehensive estimations of tuna being simultaneously caught during a fishing event as well as detailed biometric sampling at the same time.

To collect all the information required observers need to follow three main working strategies:

1. **Work Strategy 1 – Estimation of tuna fishing event catch composition**

2. **Work Strategy 2 – Estimation of bait fishing and/or bait purchase event catch composition**

Sampling Objectives

The sampling strategies have three main objectives:

A. Estimate CPUE (catch per unit of effort)

B. Estimate catch composition

C. Collect biological biometrics

A. Catch Per Unit of Effort (CPUE)

Information on fishing operations and gear can be obtained from:

1. Fishing master logbook

2. Observer monitoring

Includes information on:

- Number of lines fishing at the same time;

- Time start and end of fishing event

- Volume of bait used

- Hook size

B. Catch and Catch Composition

Catch and catch composition can be obtained:

- **Vessels logbook**

- **Observer monitoring**

Two possibilities

1. **Total observed catch** *(100% of the poles fishing are monitored / the totality of the bait caught is monitored)*

2. **Part of the catch** *(a % of the poles fishing are monitored and the figures raised, a % of the bait caught is monitored and the figures raised)*

B. Catch and Catch Composition

RAISING OF THE OBSERVED CATCH TO THE TOTALITY OF THE POLES FISHING

% of Poles Observed $=$ $\dfrac{\textit{Number of poles observed}}{\textit{Maximum number of poles fishing at the same time during the fishing event}}$

% of Bait Observed $=$ $\dfrac{\textit{Number of bait brails or buckets observed}}{\textit{Total number of brails or buckets transferred from the net to the bait tanks}}$

B. Catch and Catch Composition

RAISING OF THE OBSERVED CATCH TO THE MAXIMUM NUMBER OF POLES FISHING

Example: Calculated total catch raised by percentage observed:

number of each species observed *divided by* **% of poles observed**

Species Observed	YFT	SKJ	KAW
Number observed	20	37	145
% of total	0.6	0.6	0.6
Calculated total catch per species (in numbers)	**33**	**62**	**242**

Sampling Methods – Estimation of tuna fishing event catch composition

There are a number of sampling methods that can be used by Observers on Pole and liners during the monitoring of tuna fishing operations for the estimation of catch and catch composition :

I.   **Exhaustive sampling**

II.   **Exhaustive sampling when present**

III.   **Random sampling**

IV.   **Systematic sampling**

I. EXHAUSTIVE SAMPLING or EXHAUSTIVE WHEN PRESENT

If the rate of fish being caught is low, position yourseld where all poling crew are visible and where all fish caught can be counted.

A. Record:

   a) start observation time;

   b) number of active fishermen;

   c) count all fish (by number) caught;

   d) end observation time.

- **EXHAUSTIVE SAMPLING** where the **entire event is sampled**.

- **EXHAUSTIVE WHEN PRESENT** where **a period** of the fishing event is sampled

II. RANDOM SAMPLING

A. Position yourself where one or more of the poling crew are visible.

B. Using a random table for the number of poling crew, randomly select a crew member to observe and count their catch over a period of time.

C. Randomly select a few other crew members during the fishing time.

NOTE: the difference for this sampling protocol is that the crew members are selected randomly and not specifical on their position.

Record:

- start observation time (*first crew observed*);
- select a crew member to observer;
- count number of fish caught by a single crew, *as the fish comes out of the water*;
- end observation time;
- start observation time (*second crew observed*);
- select a crew member to observer;
- count number of fish caught by a single crew, *as the fish comes out of the water*;
- end observation time;
- *repeat process as practical time allows.*

# How to Generate a Random Table in Excel Using the Function RANDBETWEEN

Step 1: Start typing the RANDBETWEEN formula in cell A2.
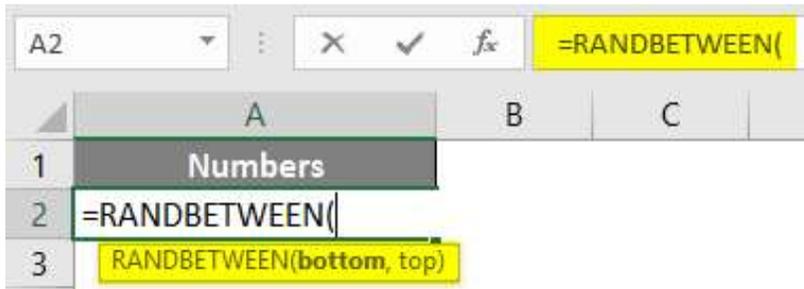
**Step 2:** Enter the bottom number as 1 and the top number as 10.
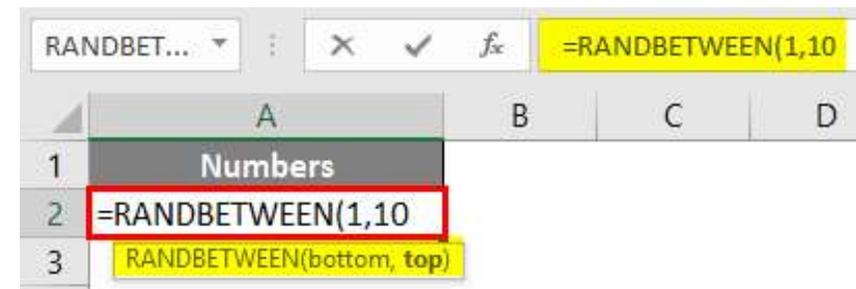
Step 3: Close the bracket and press Enter key to see the output.
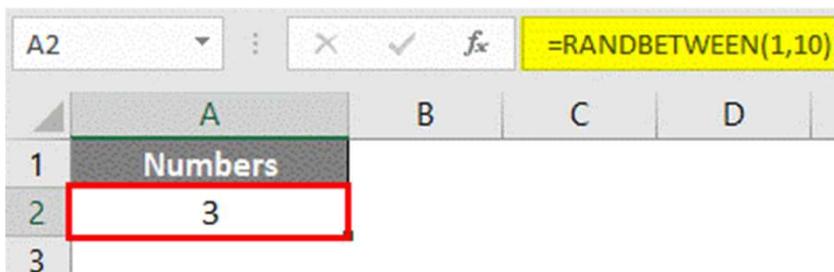
You can see a single random number between 1 to 10 is generated under cell A2.

Step 4: If you want to generate 10 random numbers between 1 to 10, then you just drag the formula across the next 9 rows.
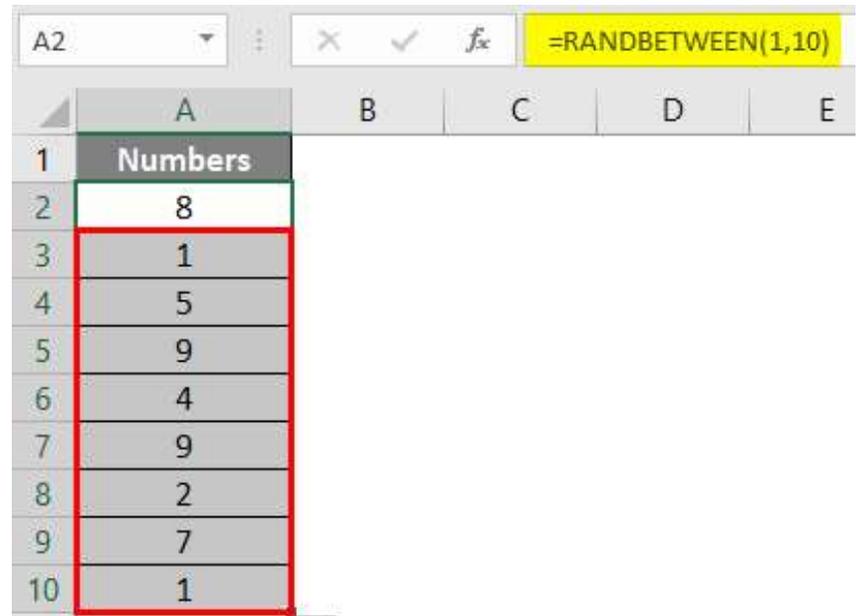
IV. SYSTEMATIC PROPORTIONAL SAMPLING

A. Position yourself where one or more of the poling crew are visible.

B. Record:

   a) start observation time (first crew observed);

   b) select a crew member to observer;

   c) count number of fish caught by a single crew, as the fish comes out of the water;

   d) end observation time;

   e) start observation time (second crew observed);

   f) select a crew member to observer;

   g) count number of fish caught by a single crew, as the fish comes out of the water;

   h) end observation time.

REPEAT FOR EACH CREW OR SELECT CREW FROM DIFFERENT POSITIONS ON THE VESSEL

Sampling Methods – Estimation of bait fishing event catch composition

Observers on Pole and liners during the monitoring of bait fishing operations for the estimation of catch and catch composition are to follow:

I.   Random sampling protocol

Determine the ratio of your sampling bucket to those on board. To do this, measure the number of buckets of water that take from your bucket to fill a ship's bait bucket. Also, determine the weight (kg) of your empty sampling bucket and note it down.

Estimation of bait fishing event catch composition

Random sampling protocol

A.   Note how many of the vessel bait buckets are loaded into the bait tanks.

B.   Ask the fishermen to get one of your sampling buckets filled directly from the net following the same procedure as used for the vessel bait buckets (random sampling).

C.   Alternate the time of collection from night to night to have a bucket collected at the beginning, middle and end of the scooping process.

D.   Using a net, drain the sampling bucket and weigh in kg the bait in your bucket. Don't forget to subtract the weight of the empty bucket.

E.   Do this once per night.

Estimation of bait fishing event catch composition

<u>Random sampling protocol</u>

E. Collect a random sub-sample from you sample (use a Tupperware).

F. Aim to collect no less than 100 fish.

G. Ensure you collect the weight of the Tupperware while empty and then with the sample.

H. Weigh the sample from the container and record it. Don't forget to subtract the weight of the Tupperware from your sample.

I. Separate the bait fish by species. Count the number of fishes per species and weigh each species separately.

J. The complete procedure only needs to be done once per night. However you should collect a sample as indicated for all hauls by taking fish with the Tupperware container directly from the ship's bait buckets as they come on board.

ANY QUESTIONS?

send us a message via Talents LMS