



STANDARD OPERATING PROCEDURE ON Life Saving Devices made of household articles

National Disaster Response Force Government of India

"BE ACTIVE!

TAKE ON RESPONSIBILITY!

WORK FOR THE THINGS YOU

BELIEVE IN. IF YOU DO NOT, YOU

ARE SURRENDERING YOUR FATE

TO OTHERS."

DR. APJ ABDUL KALAM

Foreword



S. N. Pradhan, IPS Director General, NDRF

"A drowning man catches at a straw"

In a desperate condition, a man tries and uses all the available resources at hand with full will to save himself. A drowning man does anything to stay afloat and so when he sees a straw he tries to catch hold of it and save himself. In such a condition, if he gets a sustainable floating device it will definitely save his life.

During floods, many a times situation may arise that resources like trained rescuers, boats etc are not enough that it can be placed in advance in affected areas or floating devices like Lifebuoy, Life Jackets etc are available with each and every person. In such condition, Improvised life saving devices, made of local & household material, is one of the best tools which can help the community to come out of flood affected areas and save many precious lives without much effort. These devices can easily be made by the community with the help of locally available material to protect themselves in the absence of boats.

Hon'ble Prime Minister, during the visit of NDRF pavilion at Police Technology Exhibition, organized at Kevadiya, Gujarat on Oct 31, 2019 on the occasion of Rashtriya Ekta Diwas, suggested that "concerted awareness drive about all such devices should be carried across the country involving the community, especially the youth".

Though community is using such devices but there is a need to standardize the knowledge of preparing improvised life saving devices and its effective use. The SOP will provide clear guidelines to prepare such improvised life saving devices and its use.

I am sure that the lifesaving skills included in this SOP will hold the key to efficient and successful disaster preparedness by the community. All users are encouraged to suggest changes to HQ NDRF, New Delhi which can be incorporated into future edition of this SOP.

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STANDARD OPERATING PROCEDURE ON LIFE SAVING DEVICES MADE OF HOUSEHOLD ARTICLES

1. INTRODUCTION

India is highly vulnerable to floods. Flood has been a recurrent phenomenon in our country and causes huge loss of lives, properties, livelihood system, infrastructure and public utilities. India's high risk and vulnerability is highlighted by the fact that geographical area of 40 million hectares (12% of the land mass) is prone to floods. On an average every year, more than 70 lakh hectares of land is affected, 1600 lives are lost and in the monetary terms, average annual damage to crops, houses and public utilities is more than Rs. 5,000 crores due to floods. Flood has also started occurring in areas, which were earlier not considered as flood prone.

Floods being the most common natural disaster, people have devised many ways of coping with them, out of their experiences. In fact, during flood disaster a large number of boats are needed to evacuate the marooned people as well as in the process of relief distribution and medical supplies. Inadequacy of flood rescue resources is a cause of concern in tackling the flood situation promptly.

Preparedness is an essential component of managing disasters. Community awareness and participation is in fact integral and extremely important aspect of all response and relief activities. As the community is not only the first responder but also beneficiary of the risk reduction and development process, people living in the community must know how to help each other in times of need. Community awareness is one of the most important tool, which has the potential to mitigate the effects of disaster.

Improvised life saving devices (improvised rafts) are one of the best tools which can help the community people to come out of flood affected area and save many precious lives without much effort. These rafts can easily be made with the help of local/household materials and it can be utilized by the community people to protect themselves from loss of life in the absence of boats. For this purpose, it is important to have knowledge of preparing improvised life saving devices (rafts) and its effective use.

2. AIM

The aim of this SOP is to lay down guidelines to prepare Improvised life saving devices (improvised rafts) and its uses in case of flood disaster.

3. PURPOSE

The purpose of this SOP is to make the NDRF personnel as well as other Govt. Officials, civil population & students familiar which the skill of preparation & use of Improvised life saving devices (improvised rafts) in order to mitigate the effects of the flood disaster.

4. IMPROVISED LIFE SAVING DEVICES (IMPROVISED RAFTS)

- (i) Water Bottle Raft
- (ii) Ball Raft
- (iii) Jerrycan Raft
- (iv) Dry Coconut Raft
- (v) Drum/Barrel Raft
- (vi) Bamboo Raft
- (vii) Aluminum Handi/Tasla Raft
- (viii) Tube Raft
- (ix) Banana Stem Raft
- (x) Tin Raft
- (xi) Thermocol Raft

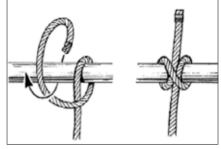
i. WATER BOTTLE RAFT:

Water Bottle Raft can be prepared from empty plastic water bottles (cold drink or water bottles) generally available in our houses. With the help of rope and five to six empty bottles (capacity 1.5/2 ltrs), this type of raft can be easily prepared. It should be ensured that the caps/covers of all the empty bottles are properly sealed. A person can tie a raft prepared in this way to cross the flooded or water logged areas from one place to another place safely. This raft can easily withstand the load of 01 person.

(a) Materials required

- 04 Meter coconut fiber rope (approx.)
- 05-06 Empty plastic bottles (cold drink or mineral water bottles) of 1.5/2 liters





(Safety Knot)

Clove Hitch

(b) Method of preparation

- Ensure the empty unbroken plastic bottles are well sealed and fix the bottle cap tightly.
- Firstly, put a clove hitch knot (as shown in the picture) with the help of rope at slightly above the bottom of the empty plastic bottle so that it may not get slipped and then put a safety knot.
- Repeat this action in all the plastic bottles and tie them side by side.
- It should be noted that the ½ meter rope should be kept free before starting
 the knot and ½ meter rope should be left free at the end for the purpose of
 tying on the chest of an individual.
- Similarly repeat this action of tying the bottle now at the neck of the bottle.
 Here also keep ½ mtr rope from starting side for tying the bottle after finishing the out
- Thus, 04 free ends of rope are available to tie two either sides of the bottle.
- Now, the water bottle raft is ready to use.

(c) Method to use





- Tie the bottle raft on the chest of an individual properly with the help of rope attached with the bottles.
- Bottles should be placed on the chest (below the shoulder joint) by putting cross knots at the back. Considering more safety, also tie the raft with the help of rope by putting cross knot from front side to back.
- Bottle neck part of the bottle should be downward.
- Ensure the bottles are properly tied with the person's body.

(d) Occasions where it can be used



- To cross the flooded area.
- Rescue of an individual during flood (avoid to use in swift river current).
- Learning swimming techniques.
- For training purpose.

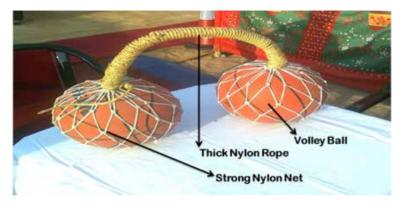
(e) Precautionary measures

- Bottle cap should be closed tightly.
- If the bottle cap is loose, don't use the bottle.
- Rope which is being used to prepare the bottle raft, must be robust/strong.

ii RAII RAFT

This raft is made by fully air filled playing football / volleyball (which is not punctured). It is prepared by wrapping two balls in strong nylon net and tying them with nylon or coconut fiber rope. A person can use the raft to travel in flood water from one place to another. This raft can withstand the load of 01 person.

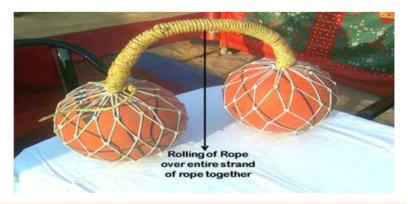
(a) Materials required



- Two Football / Basketball
- Two pieces of nylon nets (Preferably of good quality thick nylon rope) in which these ball should be separately wrapped easily.
- 10 meter thick (05 08 mm) nylon or coconut fiber rope.

(b) Method of making

- Put the ball into the net securely so that it can be tied with the help of rope.
- Keeping them about 02 feet apart and repeat the towing 10 to 12 times from one end to another, making it flock of rope thick enough to withstand the weight of the body.
- For strengthen the rope, tie all the strand together by rolling a rope over it side by side to make this part of rope as cylindrical roll.
- Tie both the ends securely.
- The basketball raft is now ready.



(c) Method to use



- Put the rope over the chest and cross both the balls back through both armpits.
- Now, lay on the water surface keeping face down.
- Secure the rope and both of the floating balls outside the water surface by keeping them under the arm.



- Considering more safety, both these balls may be tied together with a simple rope on the back. This will not allow these balls to get separated from the body.
- This raft will keep the body floating on the water surface and prevent drowning

(d) Occasions where it can be used

- During flood to cross water logging.
- To cross river
- Learning swimming techniques.
- For training purpose.

(e) Precautionary measures

- Ball should not be puncture.
- It should be fully filled with air.
- Rope should be carefully attached with the net.
- Net should not be broken or weak.
- Rope arm of both these balls should be securely placed under the armpit.
- Both the balls should be towed together on backside for more safety.
- Balls should be kept parallel to back side of the hand.

iii. JERRYCAN RAFT

This raft is made with the help of plastic jerrycan available in the house. A person can move from one place to another in a flooded area by binding two empty plastic jerrycan (05 Ltr capacity) with rope attaching to his chest. This raft can easily withstand the load of 01 person.



(a) Materials required

- Two Empty Plastic Jerrycan of 05 Ltr capacity
- 10 m coconut fiber rope (thickness of rope 05 08 mm)

(b) Method of making

• Take two Jerrycan of 5 Ltr capacity with its cap tightly closed and tie the rope with the handle of each jerrycan keeping them about 02 feet apart.



- Repeat the towing 7 to 8 times from one handle to another, making it flock of rope thick enough to withstand the weight of the body.
- For strengthen the rope, tie the entire strand together by rolling a rope over it side by side to make this part of rope as cylindrical roll.
- Now, Jerrycan raft is ready to use.

(c) Method to use

- Put the rope over the chest and pass the jerrycan to the back through both the armpit.
- Now, lay on the water surface keeping face down.
- Secure the rope and both the floating jerrycan outside the water surface by keeping them under arm.
- For more safety both the jerrycan may be tied together with a simple rope behind the back. This will not allow the jerrycan to get free from the body.



 This raft will keep the body floating on the surface of the water and prevent one person to from drowning.



Occasions where it can be used

- During flood to cross water logging.
- Learning swimming techniques.
- For training purpose.

(e) Precautionary measures

- Jerrycan should be intact i.e. no crack or puncture.
- · Cap of the jerrycan must be tightly closed.
- Rope arm between both the jerrycan should be securely placed under the armpit.
- Both the jerrycan should be towed together for more safety if wanted to swim while using this raft.
- Jerrycan should be kept parallel to the backside of the hand.

iv. DRY COCONUT RAFT



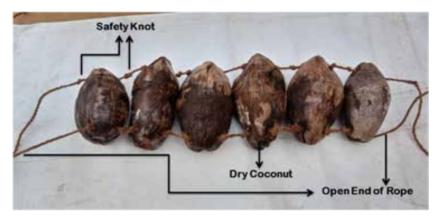
This raft is prepared with the help of the dry coconuts available in the houses / local markets. It is made by attaching 06 - 08 dry coconuts with the help of rope. A person can move from one place to another in floodwater by applying such a well prepared raft to his chest.]

(a) Materials required

- 06 dry coconuts
- 03 mtr coconut fiber rope

(b) Method of making

 Make two holes by piercing through big needle or 08 to 10 inch nail at the upper and lower part of the coconut so that coconut rope may go through the hole.



- Pierce one end of the rope into the dry coconut keeping about ½ mtr rope free outside the first coconut
- Put two knots on either side of coconut besides the hole so that coconut could be fixed between the knots.



- Similarly tie all the coconuts one by one alongside each other to make it like a belt of coconut.
- Repeat this process with the lower hole of the coconut also.
- After the last coconut, put the knot to secure the coconut at its place.
- Keep about ½ mtr of the rope free at the end.
- Now, a belt of dry coconuts is ready with two ends of the free rope on each side of the rope.
- Now, the dry coconut raft is ready.





(c) Method to use

- Tie the coconut raft on the chest of an individual properly with the help of rope attached with the coconut.
- Coconut should be placed on the chest (below the shoulder joint) by putting
 cross knots at the back. Considering more safety, also tie the raft with the help
 of rope by putting cross knot from front side to back.
- Keep the upper parts of the coconut upward while tying the raft along the chest.
- If coconuts are placed on the back and end of the rope are tied at chest then user can also easily float or swim on the water surface keeping face down.
- If raft is tied in front of the chest, individual can float on the back or keep floating while standing in deep water.







(d) Occasions where it can be used

- During flood to cross water logging.
- To cross the river with mild stream.
- Learning swimming techniques.
- For training purpose.

(e) Precautionary measures

- All the coconut must be dried.
- Dry Coconuts must be tied properly and be secured with knots to each other so that it could not be displaced.
- Tie the free end of the rope in cross manner to avoid the slipping out of the body.

v. DRUM /BARREL RAFT

It is prepared by tying two or more empty PVC barrels with the bamboo / wooden planks with the help of rope. With the help of this raft, 02-04 persons can easily go from one place to another during the flood. The empty barrels should be sealed well before use.

(a) Materials required

- Two plastic drums/barrels of 220 ltr capacity.
- Approx 50 mtr coconut fiber rope (05 to 08 mm).
- 04 dry bamboo logs or wooden planks approx 02 feet more than the total diameter of the drums in use. 12 – 15 pieces of bamboo or wooden planks (approx. 04 feet length for making platform)

(b) Method of making

- Place two bamboo logs or wooden planks parallel to each other on a plane surface at a distance about one foot less than the length of the drum.
- Place the drums side by side on laying position across both the bamboo so that the edge of drum is 6" outside the bamboo.
- Seal the caps of the drums.
- Now, place another set of Bamboo or planks over the drum vertically opposite on the drum.
- Tie both the bamboo logs / wooden planks tightly together keeping the drum between them
- Ensure that the entire drum is secured properly between the bamboo or wooden planks.



- Make small platform with the help of bamboo pieces as shown in picture.
- Now, the drum raft is ready.
- This raft can withstand the load/weight of 02 04 persons. Establishing balance on the raft is important.

(c) Method to use

- Place the drum raft on the surface of water and either sit on it comfortably or make some platform on the drum raft to carry load.
- Use a long bamboo log for balancing and giving direction to the raft.
- Wooden planks may also be used to make platform over the drum/barrel and tie it safely with the bamboo sticks of the raft. In this way, drum raft may also be used to carry household goods, kids or livestock like- goats, sheep, dogs etc. from one place to another in flooded or water logging area.

(d) Occasions where it can be used

- To cross the water logging during flood.
- It can also be used to shift household goods, grains, children or small cattle like goats, sheep or dogs through water-logged areas.
- To cross the river with mild stream.
- For the training purpose.

(e) Precautionary measures

- All the drums must be tied with bamboo or wooden planks tightly and securely.
- While sitting on raft use bamboo log for directing and balancing the raft in the water
- Do not move on this raft in standing position. Always make smallest posture while moving on this raft (Sitting position is recommended).
- It would be more safe putting on bottle raft or coconut raft while moving on this raft

vi. BAMBOO RAFT

Bamboo raft is made with the help of bamboos & rope as per the need. It can be used to move from one place to another in a flooded area easily.

(a) Material required

- 10 to 12 Nos. of dry bamboos of at least 4" diameter and 05 mtr long.
- 05 mtr strong coconut fiber rope to tie the bamboo.

(b) Method of making

- Split a bamboo into two pieces along the longer axis and place two of it on plane surface about 4' foot apart.
- Place the remaining bamboo side by side perpendicular and over these two bamboos.
- Now, tie these bamboos with coconut fiber rope along with the support of half part of bamboo as shown in the figure.
- This raft will be formed as platform.
- This raft can withstand the load of single person.
- If we increase the size of the bamboo then load bearing capacity will increase.



(c) Method to use

 For using this bamboo raft place this raft on the surface of the water and place this raft under the chest by laying over it keeping face down.



- Hold the other edge of the raft strongly with hand and keep all the body part floating in the water.
- This raft can also be used to row in swift water while sitting on it.
- This raft may also use to shift house hold goods, grain, children or small cattle like goat, sheep etc from one place to another through water logging areas.

(d) Occasions where it can be used

- During flood to cross the water logging.
- May use to shift house hold goods, grains, children or small cattle like goats, sheep or dogs through water logged areas.
- To cross the river with mild stream.
- For the training purpose.

(e) Precautionary measures

- All the bamboos must be tied and lashes to each other with support, very tightly and securely.
- Use this raft to shift the load only in water logged area for more safety.

vii. ALUMINUM HANDI / TASLA RAFT

Handi / Tasla raft is prepared with the help of two numbers of Aluminum Handi / Tasla being used in home cooking. First, the mouth of the Tasla is tightly sealed with the help of plastic and rope. This raft is then made by connecting two Aluminum Handi / Tasla with rope & bamboo sticks. A person can move from one place to another in flood water by applying such a well prepared raft to his chest.

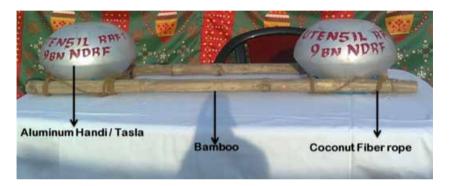


(a) Materials required

- 02 Aluminum Handi / Tasla (minimum having capacity of 5 liters each)
- Approx 05 mtr coconut fiber rope (approx.)
- 02 Bamboo Sticks (03-04 feet each)
- Plastic Sheet: 01 mtr x 01 mtr

(b) Method of preparation

 Sealed open mouths of both Aluminum Handi / Tasla tightly with the help of plastic sheet & rope.



- Attach both Handi / Tasla at the ends of bamboo sticks properly with the help of rope.
- Ensure both Aluminum Handi / Tasla are tied properly with bamboo sticks.
- Now, the Aluminum Handi / Tasla raft is ready to use.

(c) Method to use





- Keep parts of the closed mouth of Aluminum Handi / Tasla towards downward.
- Put user's chest on bamboo sticks between the both Handi / Tasla & hold the sticks.
- Now, lie flat on the stomach (Prone position) in water by holding the raft on chest.

(d) Occasions where it can be used.

- To cross the flooded area.
- Rescue of an individual during flood (avoid to use in the sharp river current).
- Learning swimming techniques.
- For the training purpose.

(e) Precautionary measures

- Open mouth of the Aluminum Handi / Tasla should be tightly closed with the help of plastic sheet.
- Rope which is being used to prepare the bottle raft, must be robust/strong.
- Avoid using this raft in sharp river current.

viii. TUBE RAFT

Rubber Tube of a medium or heavy vehicle can be used as an improvised life saving device / raft for shifting one person from one place to another in flood water.

(a) Materials required

01 Rubber Tube of medium / heavy vehicle.

(b) Method of preparation

- Rubber Tube should be filled up with air properly.
- Now, the Tube raft is ready to use.

(c) Method to use

- Place the rubber tube on the water surface.
- Place your body in the centre of the tube. Keep the tube around the chest.
- With the help of both hands / shoulder joints, place the tube well in your body.
 Under arm the tube.
- Now, 01 person can float in the water with the help of this raft.



(d) Occasions where it can be used

- To cross the flooded area.
- Rescue of an individual from water surface.
- Learning swimming techniques.
- For training purpose.

(e) Precautionary measures

- Prior to using the rubber tube as an improvised life saving device, it should be ensured that the tube is not puncture.
- Avoid using use this raft in swift river current.

ix. BANANA STEM RAFT

Banana Stem raft is prepared with the help of banana stems and rope. It can be used to move safer place during the flood.

(a) Materials required

- 06 -08 banana stems about 4-5 foot long.
- About 30 mtr coconut fiber rope.
- 04 bamboo sticks about 5 feet long.

(b) Method of preparation



- Place two bamboo sticks on plane surface parallel to each other and about 4 feet apart.
- Place the banana stems side-by-side perpendicular and over these two bamboos stick.
- Place the remaining bamboo stick over these stick keeping banana stem in between them for more safety.
- While placing these bananas, diameters of banana stem is keep in mind.
- At one end, thick side (i.e. root side part) of banana should be followed by thin side (i.e. top side part) so that finally the edges of assembly may become as parallel as possible.

- Now, tie and lash these bamboos together with banana stems using coconut fiber rope.
- Now, banana stem raft is ready to use.
- This raft can withstand the weight of two-three persons depending upon the size and length of the banana stems.

(c) Method to use

- Place the banana stem raft on the water surface.
- allow to Sit two or three persons on this raft and start rowing it, using long bamboo log from one side to another side of the river.



 This raft may also be used to shift household goods, grain, children or small cattle like goat, sheep etc from one place to another through water logged areas.

(d) Occasions where it can be used



- To cross the flooded area.
- Rescue of an individual from water surface.
- In shifting household goods, grain, children or small cattle like goat, sheep etc. from one place to another through water logging or flooded areas.
- For the training purpose.

(e) Precautionary measures

- Tie all the banana stems and bamboo sticks safely and tightly.
- Avoid using this raft in standing position.
- Keep long stick or log for rowing and giving the raft direction.
- Avoid using this raft in swift water current.
- Use this raft in waterlogged area and mild stream of water in flooded area.

x. TIN RAFT

Tin raft is made with empty tin can available in the houses. Ensure the mouth of empty tin cans should be sealed properly before using this raft.



(a) Material required

- 03 04 Nos of 15 ltr empty tin can of oil.
- 04 bamboo sticks of approx 04 foot long.
- About 10 mtr coconut fiber rope (05 08 mm).

(b) Method of preparation

- Seal the open mouth of the tin can properly.
- Place all the tin cans side by side.
- Use two bamboo sticks to hold all the tin together and tie both the stick so that tins are tightly closed in between.
- Now, roll this tin assembly to another side and again by putting two sticks on opposite side of tin assembly and tie them together properly.
- At both of the end, tie the stick in cross manner for more safety.
- In this way, now all the tins are kept and fixed among 04 stick of bamboo as shown in figure.
- Now, Tin raft is ready to use.
- This raft can withstand the weight of two persons if we use it for crossing the water logging or mild stream flooded river while holding it.

(c) Method to use

- Place the Tin raft on the water surface.
- Hold this tin assembly under the chest and keep body weight on the tin
 assembly or hold the bamboo part of this floating raft tightly keeping your body
 flat and face down. This way body will float on the water surface with the help
 of Raft

(d) Occasions where it can be used

- To cross the flooded area.
- Crossing the river with mild stream of water.
- For the training purpose.

(e) Precautionary measures

- Tie all the Tin cans and bamboo sticks safely and tightly.
- Avoid using this raft to row while sitting on it.
- Ensure all the tin cans are properly sealed by putting it into water and observing any bubbles coming out of water through the tin.
- Hold the raft tightly while floating with it.
- Avoid using this raft in swift water current.
- Use this raft in waterlogged area and mild stream of water in flooded area.

xi. THERMOCOL RAFT

Thermocol is one of the common materials found in our houses. It has property to float on the water surface. By using pieces of thermocol, a life saving device / improvised raft for 01 person can be easily prepared.

(a) Materials required

- Pieces of thermocol (1.5" 2" thickness)
- T-Shirt or Shirt (optional)

(b) Method of preparation

 Tie the lower part of T-shirt or Shirt (wear by a person) with the help of some strong string around the waist so that thermocol place under the cloth must not get away from the body.







- Pieces of thermocol can also be properly tied & secured on the chest & back side of a person without using T-Shirt or Shirt as shown in the figure.
- Place the thermocol pieces inside the T-Shirt / Shirt up to the chest level (front & back side both).
- Tie the T-shirt or Shirt with string around chest below the under arm also to keep the pieces of thermocol in place.

(c) Method of use

- Tie the upper and lower part of the T-Shirt or Shirt while filling it with the thermocol. Then, go inside the water logging area.
- Pieces of thermocol can also be properly tied on the chest & back side of a person.
- In this way, 01 person can easily float on the water surface in standing position.





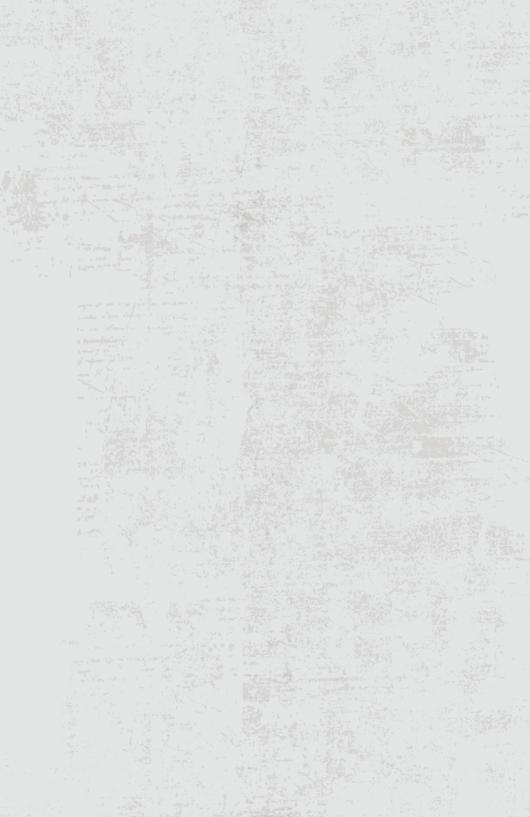
(d) Occasions where it can be used

- To cross the flooded area
- Crossing the river with mild stream of water.
- For the training purpose.
- Ensure thermocol should be properly secure inside the T-Shirt or Shirt so that it can't get away from the individual's body.
- If pieces of thermocal is used without cover of T-Shirt of Shirt, then it should properly be tied & secure on the individual's upper part of body.
- This raft is suggested to use for few hours only.

5. CONCLUSION

This Standing Operating Procedure (SOP) has been prepared with the objective to generate awareness about improvised life saving devices (improvised rafts). and preparation by the community people as well as Govt. Officials engaged in managing disasters. This SOP will also be served as guideline to prepare various improvised life saving devices (improvised rafts) using household goods which are easily available.

DISCLAIMER: The SOP is not intended to be exhaustive/final and is subject to modification from time to time as per the requirement/exigencies.











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