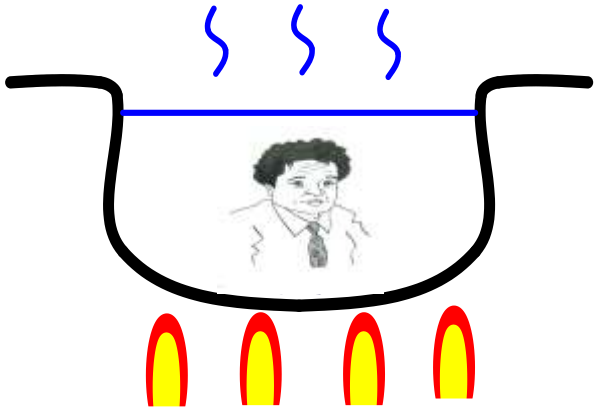
～先人の教えに学ぶ～
Learn from the wisdom of ancient people
ローテク防災術　実習
Technical Training for Low-Tech Disaster Prevention



私たちのおかれている状況

This is the state we are in.

January 23, 2017

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どちらが駐車禁止マーク？

Which is a no-parking sign?

A

B

正解は　Answer

※NOの重ね合わせからきたマークと教えられれば、理解し、記憶して忘れない。

* Learning that the symbol is actually a combination of the letters N and O (NO) helps you to understand it and make it stay in your memory.

これと同じ、わかったようでわかっていないのが

Similarly, many people only have a vague idea of:

防災（Disaster prevention）

◎災害時には、学校や本から学ぶ知識（形式知） に対して、実際に災害を凌いできた現地の知恵（暗黙知）が必要。

◎In the face of a disaster, what we require is local knowledge that has been acquired through actual experience of surviving disasters（tacit knowledge）, rather than knowledge that has been learnt in school and from books（explicit knowledge）.

◎自分が災害時に体現できて、はじめて知識が知恵になる。

◎Your knowledge will turn into wisdom only when you put it into practice in the event of a disaster.

四国は災害最前線
Shikoku is on the disaster front line

Cape Muroto

Cape Ashizuri

四国には防災文化がある。
Shikoku has a culture of disaster preparedness.

香川大学 Kagawa University


鳴門海峡大橋
O-Naruto Bridge

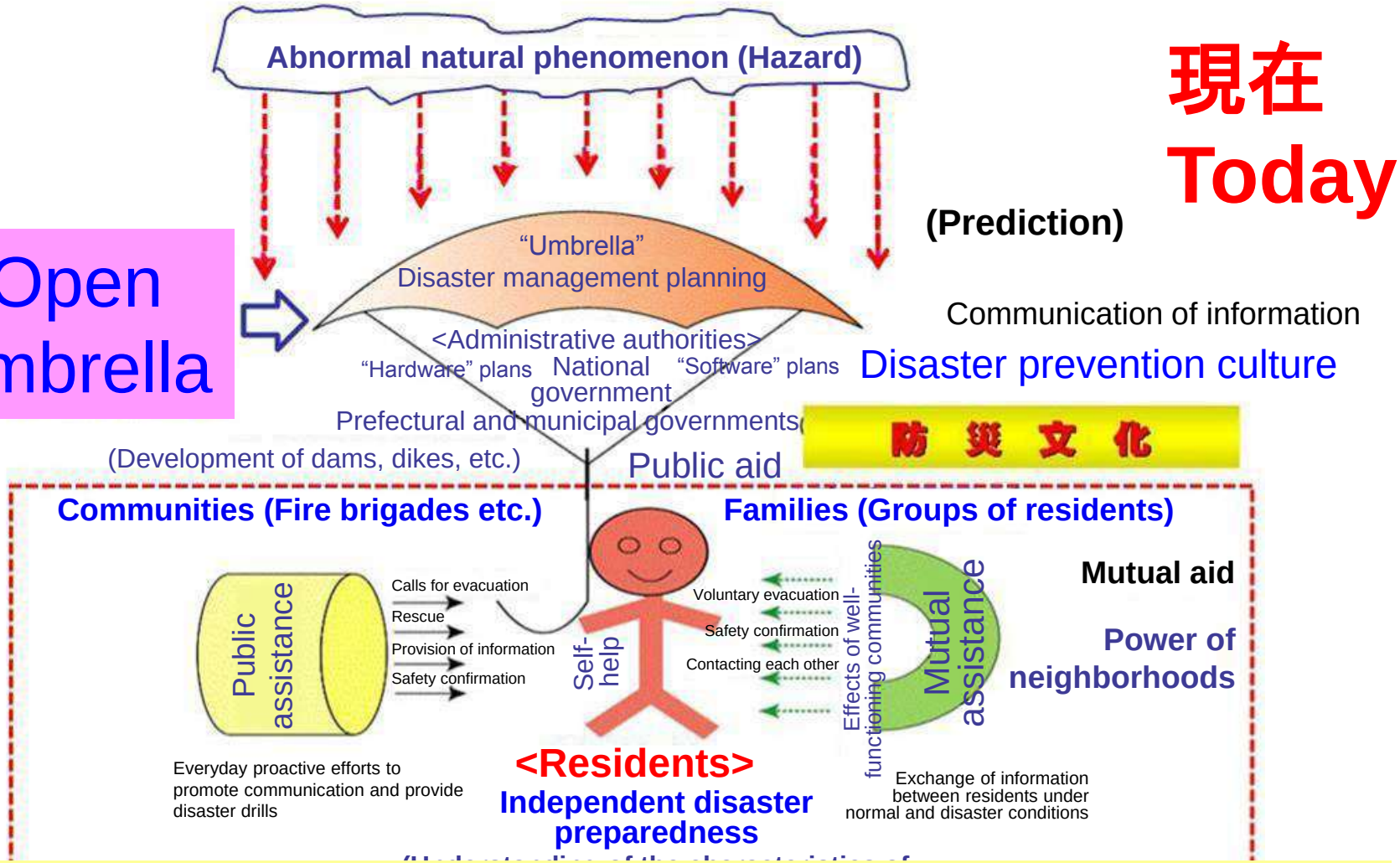

瀬戸大橋
Seto Ohashi Bridge


来島海峡大橋
Kurushima-Kaikyō Bridge

四国は太平洋からやって来る津波や台風と戦う最前線である。
Shikoku is located on the front line in battles against tsunami waves and typhoons striking from the Pacific Ocean.

災害対処の昔と今
Disaster responses of today and the past

今も昔も防護水準を超える災害は発生します。
Disasters exceeding the protection standards did happen in the past and can happen today.



深夜、早朝など行政が機能しない場合がある。その際には家庭で災害に向き合うローテク術が必要になります。
There are times when administrative functions are not in operation, such as late at night and early in the morning. This is when families require low-tech disaster response skills to respond appropriately to the disaster by themselves.

最近、注目されるになったローテク防災術
Low-tech disaster response skills drawing increasing attention these days

命をまもろう！
「ローテク防災術」を学ぼう！
Protect your life!
Learn “low-tech disaster response skills”!

誰にでも簡単できる「ローテク防災術」を私が実際に体験してきました。
I have experienced some “low-tech disaster response skills,” which are easy to master for anyone, myself.

ここに色んな道具がありますがこれがローテク術ですか？
Here are a wide variety of tools. Are these for the low-tech skills?

松尾さんは、誰でもできる「ローテク防災術」の普及に力を入れています
Matsuo-san is endeavoring to promote “low-tech disaster response skills,” which are easy to master for anyone.

ハイテクという言葉がありますが、電気、電話、パソコンが使えないと役に立ちません。
Those “high-tech” skills often become useless without electricity, telephones, PCs, etc.

そういうものがなくても、誰にでも簡単できるが「ローテク防災術」
Without these things, by contrast, “low-tech disaster response skills” can be easily used by anyone.

どこにでもある新聞紙やペットボトル、竹、ロープとかを使いますので簡単にできます。
They are simple skills that only require materials that can be found anywhere, like newspaper, plastic bottles, bamboo poles and ropes.

瀬戸海放送、KSBスーパーJチャンネル「命をまもろう！KSB防災事典」（平成28年7月28日）

6つのローテク防災術の体得
Master six low-tech disaster response skills

① 南海トラフ地震かどうかの見分け方
1. How to identify Nankai Trough earthquakes

② 地震マン5匹の手下をやつける方法
2. How to stop the five monsters working under the Earthquake Monster

③ 風向きから台風の位置を知る方法
3. How to read the wind to locate a typhoon

④浸水時の避難に”さぐり棒”の作り方
4. How to create a “Way-Finding Stick” for evacuation when the route is flooded

⑤簡易雨量計の作り方
5. How to create a simple rain gauge

⑥新聞紙の簡易スリッパの作り方
6. How to create makeshift slippers using newspaper

是非、体得して帰ってください。
I hope that you will leave with all these skills.

①南海トラフ地震かどうかの見分け方
1. How to identify Nankai Trough earthquakes

地震が来たときそれが南海トラフ地震か見分け方があるのですか？
Is there any way to tell whether the earthquake is a Nankai Trough earthquake when hit by an earthquake?

地震の揺れている時間をはかることです。トラフ地震は時間が非常に長い。
One way is to measure the length of the quake. A Trough earthquake should last very long

例えば3分以上揺れていたらマグニチュード９の今　想定している大きな南海トラフ地震
If the quake lasts for more than three minutes, for example, it should be the magnitude-9 Nankai Trough Megathrust Earthquake, which is projected now

昭和の南海地震というのは、１分揺れている　いちばん小さい。
The Nankai Earthquake in the Showa period lasted for one minute. The smallest one.

大きいは３分以上、今度　３分以上揺れたら政府が想定しているマグニチュード９の大きな南海トラフ地震だと考えてください。
Large-scale ones lasted for more than three minutes. Next time we are hit by a quake lasting for more than three minutes, you can think that it should be the magnitude-9 Nankai Trough earthquake predicted by the Japanese government.

Source: "*Inochi wo Mamoro! KSB Bosai Jiten* (Protect Your Life! KSB Disaster Management Encyclopedia" (July 28, 2016), a TV program broadcasted on KSB Super J Channel by Setonaikai Broadcasting Co. Ltd.

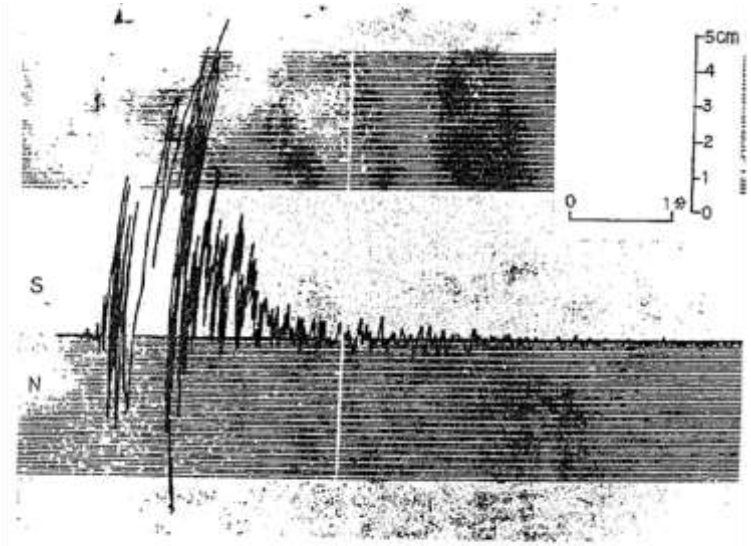
① 南海トラフ地震かどうかの見分け方
1. How to identify Nankai Trough earthquakes

揺れの時間が1分以上長いかどうか
Whether the quake lasts for more than one minute

宝永地震(1707年)は、2分余りは揺れた記録有り。
The 1707 Hoei Earthquake lasted for over two minutes.

昭和南海地震(1946年)は、1分以上は揺れた。
The 1946 Nankai Earthquake in the Showa period lasted for more than one minute.

昭和南海地震は地震計の記録から1分以上は揺れている。
According to seismograph records, the Nankai Earthquake in the Showa period lasted for more than one minute.



Nankai Earthquake on December 21, 1946 (Kochi Meteorological Observatory)

○1分以上ゆれたら南海トラフ地震
○Quakes lasting for more than one minute are Nankai Trough earthquakes.
○3分以上もゆれたら M9の巨大南海トラフ地震
○ If the quake lasts for more than three minutes, it should be the magnitude-9 Nankai Trough Megathrust Earthquake.

②地震まんの5匹の手下をやつける方法
2. How to stop the five monsters working under the Earthquake Monster

じしんまん
Earthquake Monster

● 5 ひきの手下をやっける対策必要。
● Measures need to be taken to stop the five monsters working under the Earthquake Monster.
そうしないと？
O　therwise...

うごく
Move

たおれる
Tumble

とぶ
Bounce

おちる
Fall

われる
Break

Source: Website of Kochi Prefecture (Kochi Prefecture's public relations mascots) and an official ShakeOut pamphlet

地震動に備える安全な姿勢は？
What position should you assume to protect yourself against seismic movements?

「あひる」すわりは×

No “ducking” ×

「ダンゴムシ」スタイルがよい○

Curl up like a wood louse ○

Three-step safety action 1-2-3

Three-step safety action 1-2-3

(1) Drop: where you are, onto your hands and knees!
(2) Cover: your head and body!
(3) Hold on: until shaking stops!

Do ShakeOut earthquake drills repeatedly until you completely master the steps.

緊急地震速報の音
Earthquake Early Warning

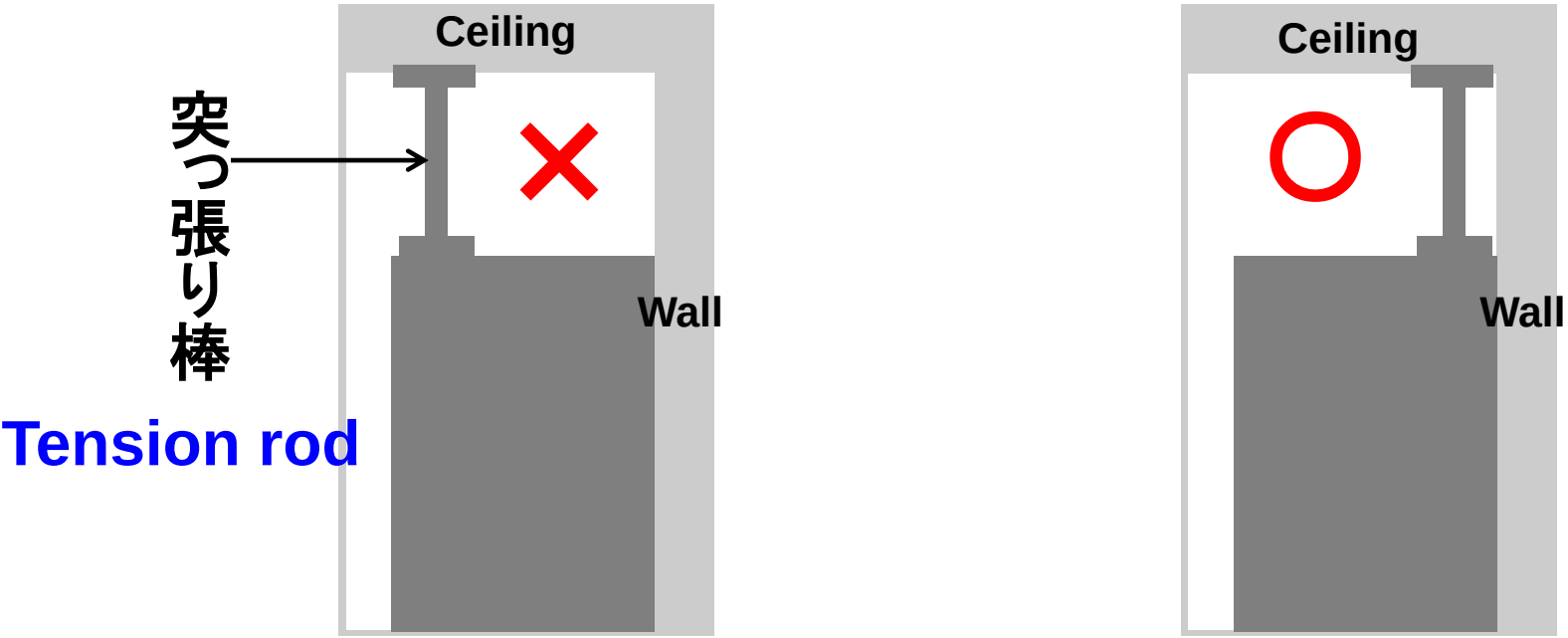
手下「たおす」に備える対策の例
An example of preparedness for stopping the monsters

突っ張り棒の付け方どちらが正解

Which is the correct way of installing a tension rod?

間違って入る方が多い

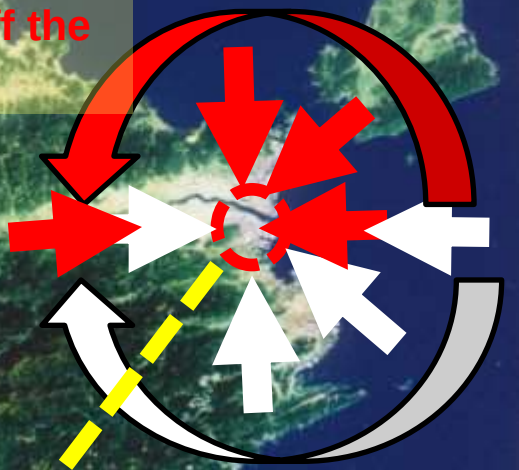
The wrong way is more common.



③ 風向きから台風の位置を知る方法
3. How to read the wind to locate a typhoon

Source: "Yu 6 (Evening 6) Kagawa"(June 23, 2015), broadcasted on NHK Takamatsu

How the wind direction changes when the typhoon passes off the east coast



How the wind direction changes when the typhoon passes off the west coast

Route of Typhoon No. 11 in 2014

Passing off the west coast

①背中に風を受け、現場に立つ
1. Stand with the wind at your back.

②左前方45度を指さす
2. Point your finger in front, 45 degrees to the left

③その延長線上に台風はいる。
3. The typhoon is on the extended line.

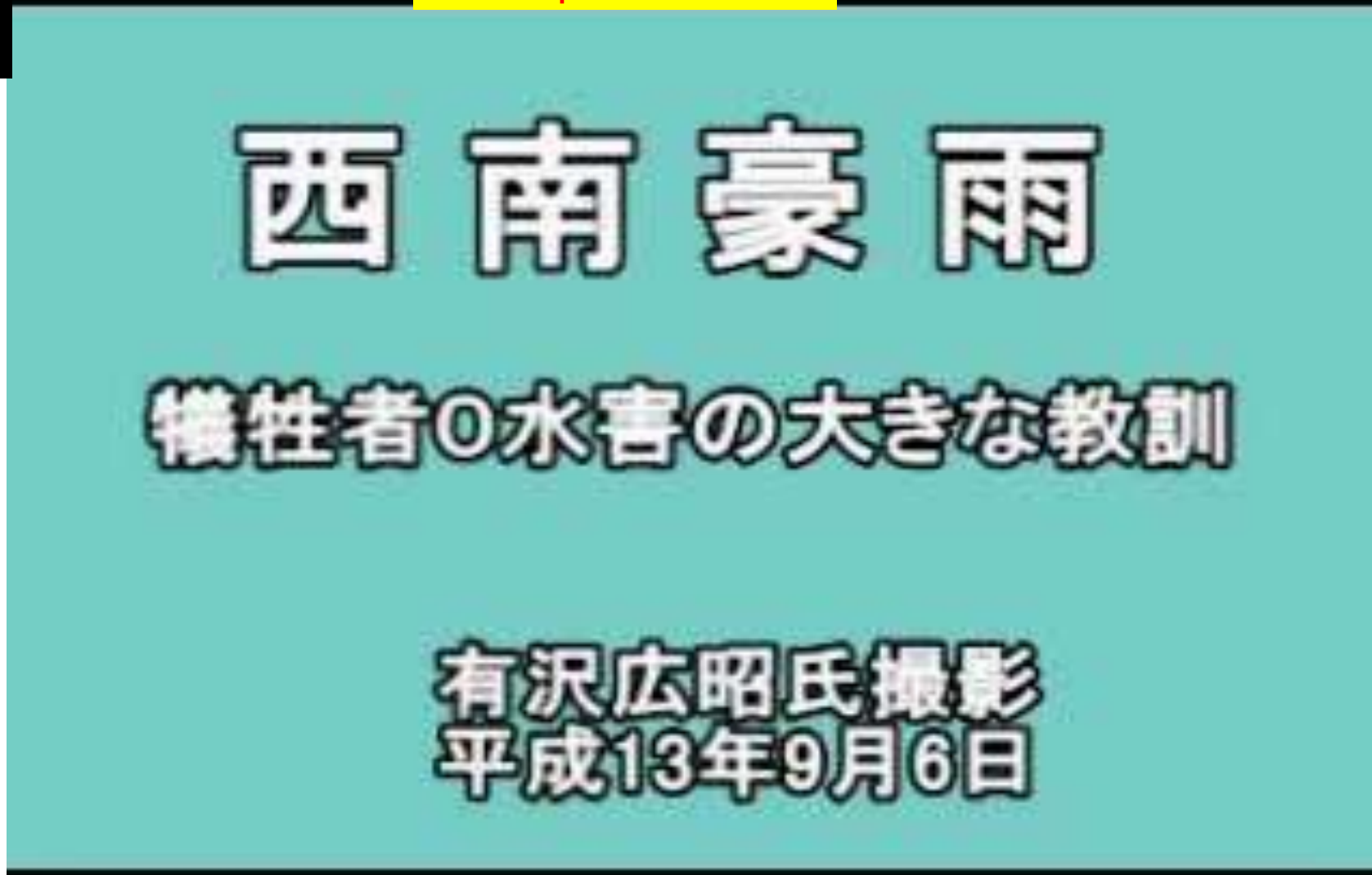
台風は左渦巻きのため風を背中に受けて立つと、左前方の方向にあります。
As typhoons rotate counterclockwise, if you stand with the wind at your back, the typhoon is to your front left.

切羽詰った水害避難から生まれたさぐり棒

Way-Finding Stick, invented out of desperate need in flood evacuation

A man escaping with an elderly person on his back

Unexpected flood



犠牲者が出なかったのは人のつながり、地域コミュニティーの健在であった

No casualties thanks to personal bonds and well-functioning local communities

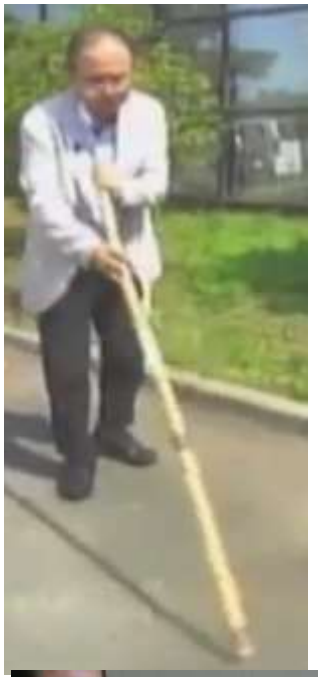
避難時には！ When you escape!

- **避難時するときは、必ず2人以上で行動する。**
- **When you escape, be sure to always be with someone else.**

- **流されたら1人では助からない**
- **There can be no one to save you if you are washed away alone.**

- **さぐり棒『命の棒』を用意しよう**
- Carry a Way-Finding Stick (Lifesaving Stick) with you.

- **笛やロープを用意しよう**
- Take with you a whistle and rope too.



- **笛は、遠くまで聞こえ、助けを求めるときに必要**
- **You may need a whistle to make a loud sound that can be heard from far away to seek rescue.**

*For more information, please listen to “Jibeta no Bosai: Saguri-bo/Rope Work,” broadcasted on December 9, 2013, in “Bo Maga” on the website of NHK Matsuyama Broadcasting Station.

④ 浸水時の避難は「さぐり棒」をもて

4. Carry a "Way-Finding Stick" with you for evacuation through a flooded route

The stick can help you to find your way under the water when evacuating through a flooded route.

こんな時の移動に 「さぐり棒」を使う

This is the kind of situation where your “Way-Finding Stick” will come in handy.

- この時場面で　さぐり棒をつかう。
- This is the time to use your Way-Finding Stick.

Source: A report in NHK’s 9 pm news program (September 10, 2015)

浸水時の「さぐり棒」の使い方
How to use a “Way-Finding Stick” on a flooded road

命を救う竹の棒
A lifesaving bamboo pole

前をさぐりながら歩く
Sweep the stick when walking to detect obstacles or barriers in your way.

一家に一棒
Every household needs at least one stick

Source: “*Inochi wo Mamoro! KSB Bosai Jiten* (Protect Your Life! KSB Disaster Management Encyclopedia” (July 28, 2016), a TV program broadcasted on KSB Super J Channel by Setonaikai Broadcasting Co., Ltd.

⑤簡易雨量計(アメミルペント)の作り方
5. How to create a simple rain gauge (Rain Measuring Bottle)

名前、アメミルペント
Rain Measuring Bottle

①浮き用のふたに シールを貼る。
1. Put a sticker on the bottle cap.

②ボトルの上部を切る
2. Cut the top part off the bottle.

③うきを入れて逆さにして差し込む
3. Place the cap (float) in the bottle and insert the top part upside down.

④テープで固定し目盛りを貼る
4. Use tape to secure the top part and place a scale

⑤時間雨量20mm黄色
5. Mark the rainfall of 20 mm per hour in yellow

⑥総雨量100mm赤色
6. Mark the total rainfall of 100 mm in red

自宅の雨量を計り、もしもの時に備えてほしい。
Measure rainfall at home to get prepared.

簡易雨量計は玄関の扉などに固定してください。
This simple rain gauge should be fixed on the entrance door, etc.

Source: "*Inochi wo Mamoro! KSB Bosai Jiten* (Protect Your Life! KSB Disaster Management Encyclopedia" (July 28, 2016), a TV program broadcasted on KSB Super J Channel by Setonaikai Broadcasting Co. Ltd.

ペットボトルで簡易雨量計を作ろう！
Let's make a simple rain gauge using a plastic bottle!


Cut the top part off using a box-cutter.


Use tape to secure it.


Put a scale.


A rain gauge is completed.

* The scale and cap stickers can be downloaded from here.

自宅で雨量を計り避難の目安を考えよう
Measure rainfall at home to determine the timing of evacuation.

大雨が降ったら早めに安全な場所に避難を！
In the event of heavy rain, you are advised to escape to a safe place at an early point in time!

土砂災害の多くは雨が原因で起こります。

Heavy rain is the most common cause of landslides.

地域によって異なりますが、雨量が1時間で20mm以上、または降り始めからの合計100mmを越えたような場合には、十分に注意しなくてはいけません。

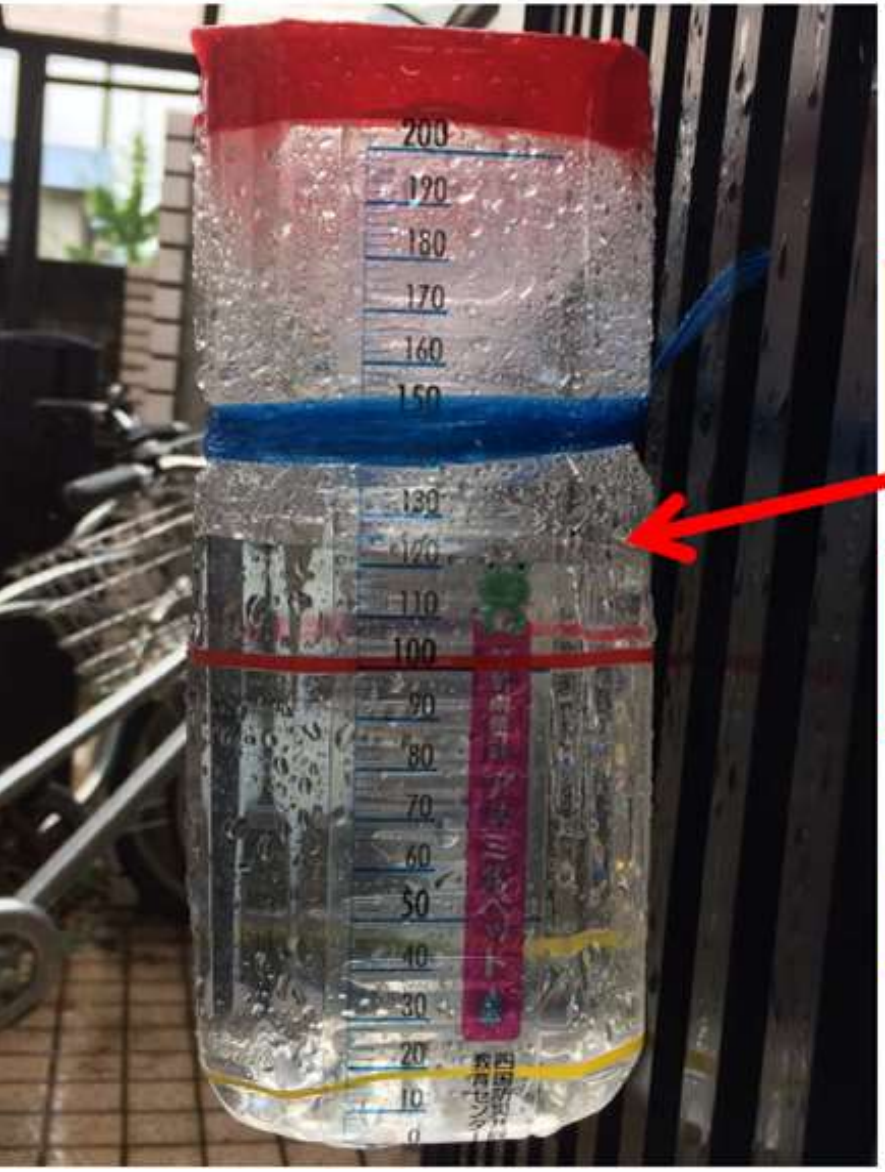
When there is 20 mm or more rainfall per hour, or the total amount exceeds 100 mm from the beginning of the rainfall, special caution needs to be exercised (although these values vary depending on the location).

簡易雨量計の製作状況

Making simple rain gauges

21

高松気象台の観測雨量との比較
Comparison with rainfall observed by Takamatsu Meteorological Observatory



Rain Measuring Bottle
124mm

Takamatsu Meteorological Observatory
126mm

July 17	Time	Temperature	Rainfall
mm (Total)	O'clock	℃	mm
76.5	1	24.3	18.5
82	2	24.5	5.5
86.5	3	24.5	4.5
91.5	4	24.2	5
96	5	24	4.5
106.5	6	23.5	10.5
114	7	23.8	7.5
121	8	23.5	7
126	9	23.6	5
130.5	10	23.6	4.5
132	11	23	1.5

* Values in "mm (Total)" are calculated from 0 mm at 9 o'clock on July 16.
* The data is sourced from the website of the Takamatsu Meteorological Observatory.

つまり・・・ほぼ同じ雨量を観測！
The result was... both had about the same measurements.

⑥ 新聞紙簡易スリッパの作り方
6. How to create makeshift newspaper slippers

①新聞紙の手前を折る
1. Fold the front section of the newspaper.

②両側を三角に折る
2. Fold the right and left corners of the folded section.

③向こう側に折る
3. Fold the section towards the opposite side.

④ひっくり返して3等分
4. Turn over and fold it into thirds.

⑤一方を入れ込む
5. Insert one third into the opposite one third.

人工芝を裏返して、窓ガラスが割れた廊下を再現
Turn over an artificial turf surface to simulate a hallway with shuttered windows.

上履きが必要なことを証明している。
It proves that footwear is necessary.

新聞紙簡易スリッパ完成。
A makeshift newspaper slipper is completed.

Source: "*Inochi wo Mamoro! KSB Bosai Jiten* (Protect Your Life! KSB Disaster Management Encyclopedia" (July 28, 2016), a TV program broadcasted on KSB Super J Channel by Setonaikai Broadcasting Co. Ltd.

Knowledge of how to make newspaper slippers will be of great help, for example in an evacuation center

1

Fold the front one fourth of the newspaper.

2

Fold the right and left corners of the folded section.

3

Fold the newspaper into half (of the original size) outward.

4

Turn over and fold the right and left one third towards the center.

5

Insert the right section (folded in Step 4) into the left section.

6

Result of Step 5.

7

Turn over and put your foot into the pocket to wear it as a slipper. (You can make it look more like a slipper by slightly tucking in the square corners.)

Completed newspaper slippers

熊本地震の避難所の様子
Inside an evacuation center after the Kumamoto Earthquake

このような時に新聞紙簡易スリッパが使える。
This is an example of a situation where makeshift newspaper slippers come in handy.

The gymnasium of Minami Aso Junior High School accommodating many evacuees while aftershocks continued in the area
Photographed by Noriko Tokuno on April 19, 2016, in Minami Aso Village
(Source: Website of Mainichi Shinbun)

誰でも簡単にできるローテク防災術を学ぼう
Let's learn low-tech disaster response skills, which are easy to use for anyone

五の術：知恵や工夫
5. Wisdom

十の術：助け合う
10. Cooperate each other

八の術：基本は逃げる
8. Escape

十一の術：あきらめない
11. Never give up!

Source: "*Inochi wo Mamoro! KSB Bosai Jiten* (Protect Your Life! KSB Disaster Management Encyclopedia" (July 28, 2016), a TV program broadcasted on KSB Super J Channel by Setonaikai Broadcasting Co. Ltd.

12 skills resulting from the lessons learned from past disasters

Low-tech disaster response skills

一術：地域の災害特性を学ぶこと

1. Learn the characteristics of the disaster risks of your neighborhood.

二術：災害への備えを忘れぬこと

2. Be always prepared for disasters.

三術：経験則を生かすこと

3. Take advantage of past disaster experiences.

四術：過去からの積み上げで安全基盤を確保すること

4. Form the foundations for safety through accumulation of past disaster management efforts.

五術：被害を減らすための知恵・工夫を生かすこと

5. Make the most of the wisdom we have to reduce damage.

六術：二重の安全策を講じること

6. Take double safety measures.

Low-tech disaster response skills

七術：被害拡大要因を小さくすること

7. Minimize factors contributing to expanding damage.

八術：災害時の基本は逃げること

8. In the face of a disaster, the basic goal is always to escape.

九術：災害時には情報を生かすこと

9. Make effective use of information in disaster situations.

十術：災害時にはみんなで助け合うこと

10. Helping each other is vital in disaster situations.

十一術：災害にあっても諦めぬこと

11. Never give up in the face of a disaster.

十二術：自然への感謝と畏敬の念を大切にすること

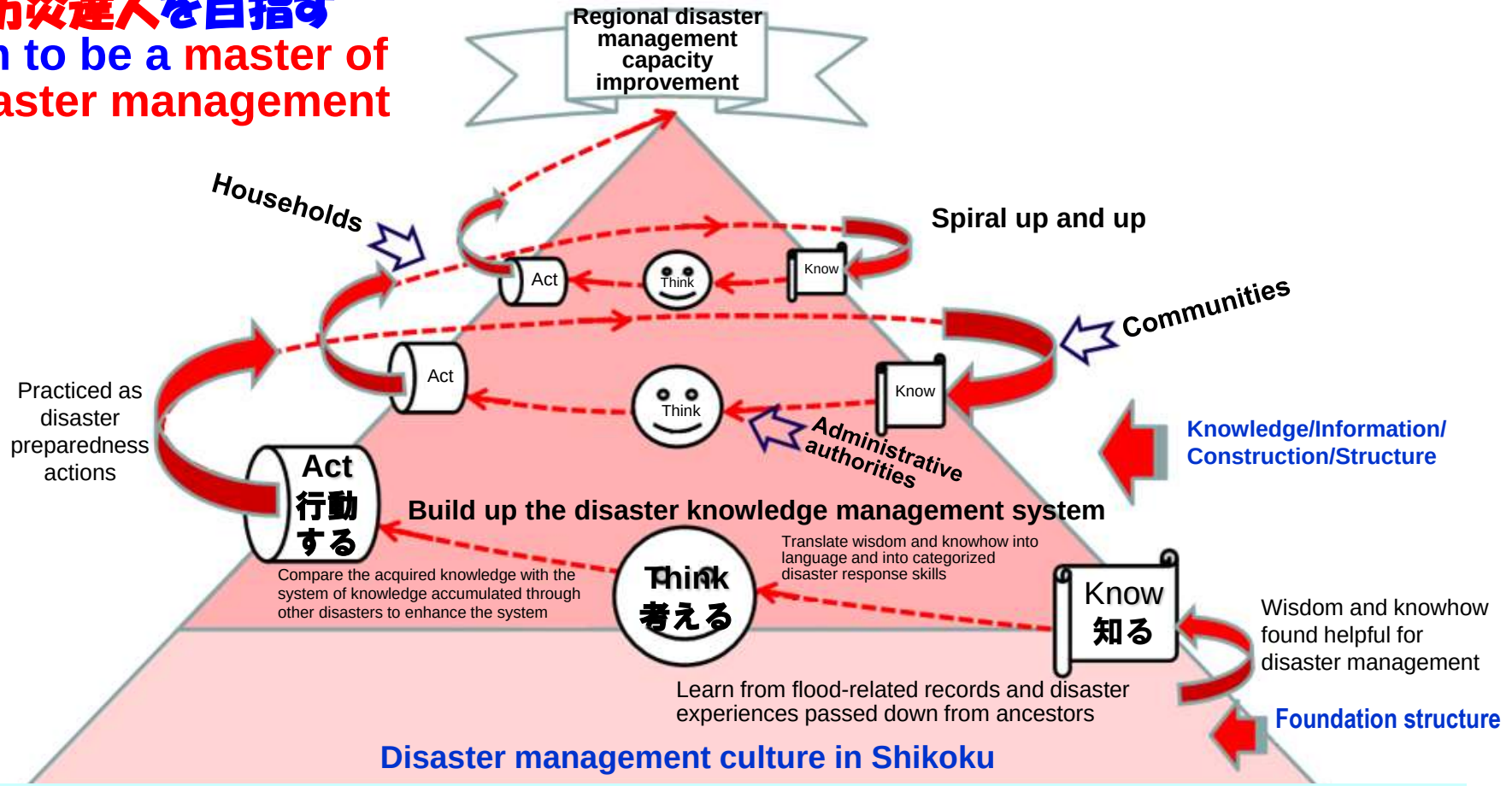
12. Be grateful to and in awe of nature.

一人一人が防災達人を目指す

Each individual should be a master of disaster management

防災達人を目指す

Aim to be a master of disaster management



○「知る Know」→「考える Think 」→「行動する Act」

○ 3つの枠組みに家庭、地域、行政の皆さんが関わることが、地域防災力の向上につながります。

○ Regional disaster management capacity can be improved when households, communities and administrative authorities are involved in all of the three stages.

防災は最後は人です

After all, disaster management boils down to people.

皆さんが「ローテク防災術」を体得し、最も大切な人の命を守る防災達人になることです。

It is people who should learn the “low-tech disaster response skills” and become masters of disaster management to protect the lives of their loved ones.

ご清聴ありがとうございました。

Thank you for your attention.