

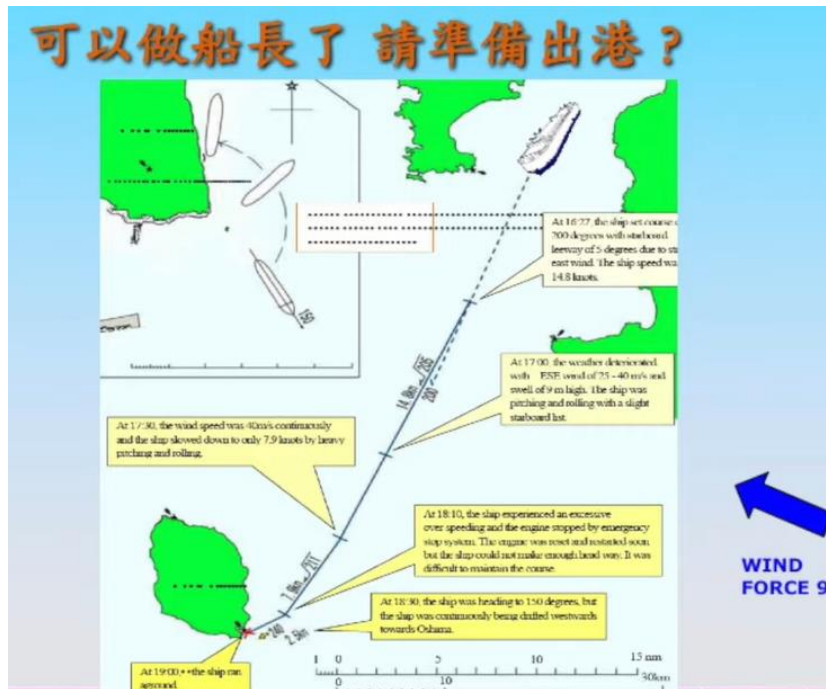
公司文化講座第32講 著名的三姐妹 三角浪 rouge wave 波浪週期 laboring :

<https://youtu.be/UhRVWsfVvV8>

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大島地區的航行危險性：

大島附近容易遇到大浪和三角浪, 造成船舶擱淺和損壞的危險。在其他地區如野柳半島、巴士海峽等也有類似情況發生。造成這種危險的主要原因是，陸地反射的浪與海上湧浪的干涉, 形成三角浪。



船舶遇到三角浪的應對措施：

三角浪會造成船舶螺旋槳暴露、主機損壞等嚴重後果。應該避開 100 尺等深線附近的區域, 以降低遇到三角浪的機率。航運專家建議應該調整航線, 遠離岸邊, 以減少遇到三角浪的風險。

船舶在大浪中的操作技巧：

要仔細觀察波浪週期, 預測大浪的出現時間, 趁小浪時機會掉頭。如果來不及掉頭, 就要等待大浪過去後再嘗試。要特別注意連續出現的"三姐妹"大浪, 這是最危險的情況。

講座詳細介紹了航海中遇到的各種危險情況, 並提出了相應的應對措施和技巧, 對於航運從業人員來說都是非常寶貴的經驗和知識。

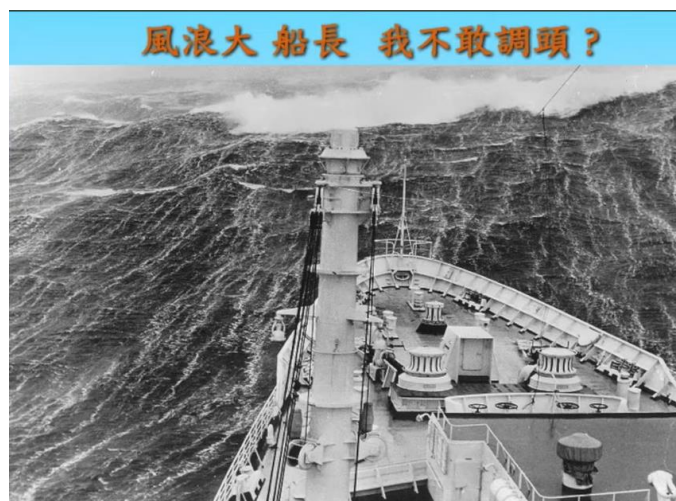
好這是 智慧講座的第八講, 今天會說些比較特殊的 case, 下面看到這一張海圖, 是在東京灣的外面, 左下角這一坨, 就叫做大島。有時候還會火山爆發, 這是大島, 是去名古屋與大阪, 哪是必經之路, 有時候從右上角到左下角, 就是東京灣出來去大阪名古屋的路上, 會走大島的上面。或者是下面。可能是走下面的, 感覺上好像是路比較省一點啦, 或是來往船隻比較少, 有一條船出港, 沿的大島下面的航路在走, 以前都是這樣子走, 都沒問題。可是今天船走到大

島的南端附近的時候，忽然就遇到大浪，失去了動力，船失去動力就漂流，被浪推到大島上面去擱淺，擱淺的時候，船還好好的，過了3個月，船就已經什麼打的，船都快要爛掉了，因為剛好這邊就是面對什麼？太平洋上來的湧，每天在邊風吹日曬，就把這船打壞。

attempted to **pass close to windward** of Oshima island.
The engine tripped out when just 2nm off the island
Before and after the casualty



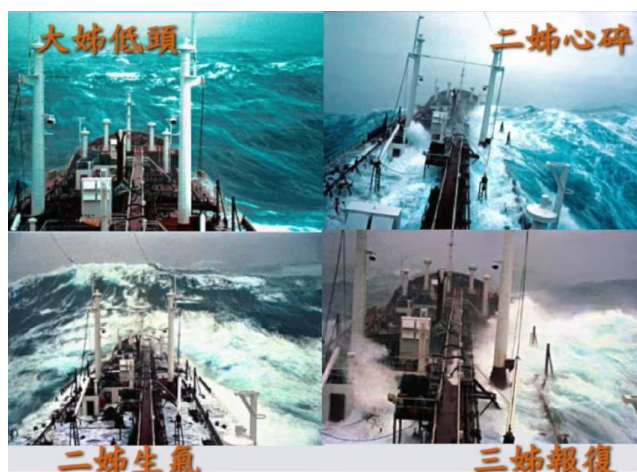
這一個 case，跟在巴士海峽/鵝鑾鼻附近，還有在野柳半島東北角的情形，就是很類似，如果講瘋狗浪，就是陸地上用的名字，就是颱風過境前後，很多方向的浪在一起互相交疊，有時候就會產生突然的大浪。在北海的鑽油平台紀錄的，最大浪高 31 公尺。



這船今天就是什麼？在颱風天出港。浪沿著風力的方向過來，叫做海浪，哪有一些浪是在幾百公里外面，被風吹起來的，持續往岸邊推進來，（這種只看到海浪，沒有看到風在吹的情形，叫做湧浪。因為把湧浪吹起來的風，是在幾百公里外吹的，已經沒有在吹了，可是海裡面的波浪/帶著風的能量，持續向前推進，就跟海嘯一樣，引起海嘯的地震也許很遠，可是被地震帶起來的波浪，就一直接近岸邊，並且了累積重疊，越近岸邊淺水/海嘯越大）等湧接近到岸邊的時候，跟岸邊吹的風浪的方向並不一致，所以兩個波浪系統，在一起交疊的話，就會引起了波峰加波峰，波谷加坡谷，就是會有不規則干涉的圖案，這些浪/湧再打到岸邊，岸邊會有一些波浪會反彈回來，反彈回來的波浪的方向，又跟海面上的風浪跟湧浪的方向不一樣，基本上就形成三個浪的系統，叫做三角浪。（在三峽也有/那是河水，台語叫做三角湧）三角浪都是接近在陸角的方向發生，野柳半島/巴士海峽/跟大島的南邊/北邊，看風浪是從哪一個方向來的，像台灣的冬天，就是東北風/東北角危險。夏天西南風，就是南邊的巴士海峽危險。在巴士海峽很多木材船了吃到三角浪，都已經掛掉，這是經常發生的事。所以台灣的這些航運專家

在研究，是不是需要做航路規劃，把什麼野柳半島的航路，離岸邊遠一點，（這是海巡署的提議喔），有些假學者專家的意見，都是說船隻擱淺跟航路是沒有關係的，怎麼會沒關係，因為就是太靠近岸邊/才會吃到三角浪。如果能離岸邊遠一點，遇到三角浪的機率就少。遇到三角浪，首先就是會飛車，船隻的船尾會被波浪抬出水面，螺旋槳本來在水裡面阻力很大，一抬到空氣中，就變成沒有阻力，馬上轉速加快，叫做飛車。飛車是很危險的，很可能就把主機的大軸/軸承弄壞了，所以遇到這種情形。普通船的主機會自動減速，如果真正飛車的話，主機還有自動保護裝置，就直接把主機停了，不讓螺旋槳空轉，這時候船隻就會失去動力。

好 這很不想講，原來就是“公來偉濤等”，說來話長，因為這裡面，缺太多的專有名詞，對一般航運界的新進人員，可能會有點負擔。所以就解釋的比較清楚，花的時間比較多，總的來講，船隻要避免遇到三角浪，世界上最出名的地方就是南非的好望角，三角浪叫做 rouge wave, 號稱是有 30 公尺的大浪打過來（七八層樓高的海浪），所以在這邊經過的散裝船斷掉，就直接下去了，甚至於求救訊號都來不及發。報失蹤的船隻，最後他們研究，就是什麼?要避開 one hundred fathoms line 避開 100 尋等深線的區域，三角浪發生的機率就少，所以各位航運先進，不要再為船公司省這一點水路，然後讓船隻一直擱淺在野柳半島上，直接就把航路畫出去，畫出去/叫他們不准靠近野柳半島，危機才能夠解除。



好下面看大風浪，船隻自動舵就已經失效了，因為一個大浪打過來，船頭就順著大浪，一下子滑到二三十度的方向外面去了，或者隨著波浪的左右搖晃（這個在氣象講座裡有解釋，是因為船在浪頭上，穩定度大幅減少），這時候 AB 也不敢操舵，因為舵角打得太大，然後加上波浪推動，船好像就快要翻掉，如果在大風浪之中，需要調頭的時候，應該要怎麼樣？在教科書上面有寫什麼，要觀察“波浪週期”？這種大風浪，如果單純的只有一個波浪系統，其實是還好解決。經常遇到海上天氣惡劣的時候。波浪是從兩三個方向來的，所以這就等於是什麼?海裡面的三角浪，岸邊有三角浪，海裡面也有三角浪，遇到時候，就要仔細觀測，幾個小浪之後，可能就會有一個大浪，哪一般都是什麼？可能是 8 個小浪，後面連續跟著三個大浪（這就是著名的三姐妹 three sisters），或者是 9 個小浪跟著連續的兩個大浪，海上了最出名的，就是連續的三個大浪，號稱是三姐妹，要等三個大浪過了以後，趁後面浪比較小的時候，趕快打舵/加車，才能夠及時掉頭轉向，如果還來不及掉頭，掉到一半，大浪又來了，這怎麼辦？就不要

再繼續轉，就要稍等一下，等大浪過了以後，再想辦法分幾個階段轉。

總之船很可能會什麼？轉了很久/根本都轉不回來。今年，有一條陽明公司的船在澳洲外海，就是吃到大浪，結果航向被大浪打的，差到 90 度之外，舵工/船長/船副三個人在上面，都沒辦法把船的航向操回來，經常斜的在走，可能就是什麼？對波浪的週期，沒有辦法掌握好，所以就是吃了很大的虧，最後貨櫃落海，人員可能也受了不少的驚嚇，航向真的操不回來的話，很可能船就是開去擱淺，又是更大的事故了。

好下面我們看三姐妹，大姐二姐三姐/這就是連續的三個大浪

像我在做實習生的時候，跑北太平洋冬天，船上開賭/牌九/麻將/梭哈，大家坐在桌子上賭博，感覺到第一個大浪來的時候(船搖的特別大)，就知道是三姐妹來了，第二個大浪撞上的時候，屁股搖一搖/手抓一抓固定在地上的桌子，第三個大浪/大家一定一隻手牢牢抓在桌子邊，因為第三個浪打過來的時候，船屁股就會抬高/飛車啊，一飛車/螺旋槳又震動，船從浪上面摔下來，因為船屁股一定會摔回海裡面，就好像坐在電梯裡面，電梯繩子斷掉，人就失速往下拋飛。這一般是船員最痛苦的時候，因為風浪大，已經吃不好/睡不好/躺在床上/都會被什麼？波浪把人甩下來。英文，這裡有一個名詞叫做 laboring，laboring 就是女人在生小孩的時候，那個痛苦的情形，

所以這三姐妹是怎麼作用？

我們看看第一個就是船，在海裡面開有相當的速度，第一個浪過來的時候，船就順著大浪騎到什麼/波浪的上頭，大浪一定是先抬高/然後再摔下去，把船抬起來/然後直接往下衝，船本身的速度加上了波浪的弧度，

船遇到第二個大浪的時候，就什麼/就會加速撞上去，這時候船因為震動，就會開始抖/一抖/抖一抖，因為船還有速度，加上船隻下降的加速度，所以第二個浪，不成問題啊，衝過去二姊就碎掉了，但是這一撞，船的速度，就去掉一半了。

等到第三個大浪，船已經過了第二個加速往前衝的大浪，因為這個波浪過去了，有一個下坡的動作，等到第三個大浪來的時候，船已經沒有足夠的力量/像第二個波浪一樣把它衝破，就直接撞上去，這一撞，就等於是撞到牆壁一樣，所以就跟著飛車啦/震動啦/什麼碗盤齊飛/麻將亂跑/文件飛出，這就是著名的三姐妹，當然船如果要斷的話，也是在第三個大浪時候，比較可能發生。

公司文化講座第 3 2 講 著名的三姐妹 三角浪 rouge wave 波浪週期 laboring：

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Good. This is the eighth lecture of our smart lecture series, and today we will talk about some more special cases. Below, we see this nautical chart, located at the lower left corner outside Tokyo Bay. This cluster is called Oshima, and sometimes volcanic

eruptions occur on Oshima. Oshima is a must-pass checkpoint on the way to Nagoya and Osaka. Sometimes, the route from the upper right corner to the lower left corner is the path to leave Tokyo Bay and head to Osaka or Nagoya. Ships sailing out of the port used to follow the route along the lower side of Oshima without any problems. But today, when the ship approached the southern tip of Oshima, suddenly encountering large waves caused the ship to lose power and drift, eventually being pushed by the waves onto Oshima and getting stranded.

While stranded, the ship remained intact for three months, and the ship was almost about to be destroyed due to the constant pounding of waves coming from the Pacific Ocean. This case is similar to the situation near the Bashi Channel and the northeastern tip of Yehliu Peninsula, because if we talk about "crazy waves" – which is a term on land – many waves generated after a typhoon overlap each other and sometimes cause sudden large waves. Today, this ship set sail on a typhoon day, and the waves, driven by the wind direction, were called sea waves. Some waves are generated hundreds of kilometers away by the wind and keep pushing towards the shore. When they get close to the shore, the direction of these waves does not align with the wind waves blowing towards the shore.

So, when these two wave systems overlap, it causes interference patterns between the waves and creates wave amplification. When these waves hit the shore, sometimes some waves bounce back. The direction of these reflected waves is different from the wind waves and surge waves on the sea surface, essentially forming a system of three waves called triangular waves. In our Sanxia area in Taiwan, there is a similar situation known as "triangular swimming." Whether in the Bashi Channel or near the southern or northern ends of Oshima, the direction of the wind waves depends on where the waves are coming from. For example, in Taiwan, in winter, the northeast wind at the northeast corner is dangerous, while in summer, the southwest wind at the south of the Bashi Channel can be dangerous.

In the Bashi Channel, many wooden ships have been sunk due to encountering these waves. This is a frequent event, so navigation experts in Taiwan are studying whether there is a need for route planning to keep the route away from the shore a bit in the Yehliu Peninsula area. The opinions of scholars and experts are that shipwrecks have no direct connection to the route. The reason is that being too close to the shore will result in encountering these triangular waves. If you stay farther away from the shore, the chances of encountering these waves will decrease. When encountering these triangular waves, the ship's stern may be lifted by the waves, causing the propellers that were originally submerged in water to suddenly be exposed to air, resulting in increased speed due to reduced resistance, known as "engine revving," which is very dangerous and may damage the main shaft of the engine.

In case of engine revving, modern control rooms will detect it automatically, and if necessary, the engine has automatic protection mechanism. The device just directly turns off the main engine, preventing it from running, causing the vessel to lose power at that time. I just sat down, and I really didn't want to talk about the original attack, escape, etc., as it's a long story. Because there are too many proprietary terms involved, it may be a bit burdensome for newcomers in the shipping industry. So I'll explain it more clearly, which will take more time. In short, ships need to avoid encountering triangular waves. The most famous place in the world is Cape of Good Hope in South Africa, which is said to have waves as high as 30 meters hitting the shore.

Therefore, the bulk carriers there often break and directly sink. Finally, their research is about avoiding by 100. Avoid this area where the depth is 100 feet on line 000. The probability of encountering a triangular wave reduces in this area. So, all maritime professionals should not try to save this little bit for the shipping company. Instead, prevent the vessels from running ashore in our Yehliu Peninsula area. Just draw a line and forbid them from getting close. Only then the crisis can be averted. Next, let's discuss the big waves. When the ship's autopilot fails due to a big wave hitting the bow and causing the ship to slide sideways at a 233-degree angle, the ship starts swaying left and right with the waves. At this moment, even AB dares not intervene because the ship is in danger of capsizing soon.

So, when we need to change course in the midst of big waves, what should we do? The textbook mentions observing the wave period. If there is only one system of waves present, it's relatively easy to handle. However, in bad weather at sea, waves often come from two or three directions. This is when we encounter triangular waves near the coast and at sea. We need to carefully observe a few small waves because they may be followed by a big wave. Usually, it's a pattern like eight small waves followed by three consecutive big waves or nine small waves followed by two big waves. One of the most famous scenarios at sea is three consecutive big waves, known as the "Three Sisters." After these three big waves pass, quickly steer the ship and accelerate when the waves are smaller to promptly change course.

If you are unable to turn the ship completely before the next big wave hits midway, wait a moment and try to maneuver after the wave passes. Sometimes, turning the ship back might be challenging or impossible. For instance, a Yang Ming Line ship outside Australia faced a situation where the ship's heading was thrown off by a big wave by 90 degrees. The helmsman, captain, and mates onboard were unable to correct the ship's heading back. The ship kept veering off track, likely due to not understanding the wave patterns properly, resulting in considerable losses, including containers falling into the sea and causing fear among the crew. Now, let's talk about the Three

Sisters - the eldest, the middle, and the youngest waves. I remember during my internship when I sailed in the North Pacific in winter, we played gambling games with alcohol onboard.

When faced with the Three Sisters waves, the first and second waves made everyone shake their bottoms and scratch, but when the third wave arrived, everyone had to firmly grip the table because... When three waves hit the boat, the stern will lift up, like a roller coaster, and the propeller will vibrate and fall from above. When the stern is lifted, it will definitely be thrown back into the sea, just like sitting in an elevator, if the rope breaks and loses speed, it will go down, this thing... This is usually the most painful time for sailors, because the wind and waves are so strong that they can't eat well, can't sleep well, and lying on the ship will be thrown off by the waves.

What about the English, there is a noun called laboring here, laboring is when a woman is giving birth, that painful situation, so how do these three sisters work, let's see the first one is the boat, in this sea, it travels at a considerable speed, when the first wave comes, the boat rides on top of this big wave, the front part of the wave must be lifted first and then dropped down to lift the boat, and then accelerate downwards directly pushing down, the boat's own speed plus the curvature of the wave, when the boat encounters the second big wave, it crashes into it, at this time, the boat will start shaking because the boat still

has speed, and with the acceleration of the boat's descent, so the second wave is not a problem, it crashes and breaks apart, but with this collision, the speed of the boat is halved, until the third big wave, the boat after passing the second big wave still accelerates forward the same way, because the wave has a downhill movement after passing, when the third big wave comes, the boat no longer has enough power to break through it like the second wave, so it crashes directly into it, this crash is like hitting a wall, so it follows, the shaking of a roller coaster and so on, this is the famous three sisters, of course, if the boat were to break apart. Words are also more likely to happen during the third big wave.