

台灣海底輸氣管線與海纜交錯原則

The Crossing Principle between Submarine Pipelines and Cables in Taiwan

111年11月22日修訂

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1.0 目的：

為強化國內天然氣供應穩定與安全管理，建立本原則，提供海底輸氣管線與國內外廠商海纜交錯參考，以利國內外廠商及相關單位遵循。任一交錯方應主動尋求被交錯方於施工前簽署交錯協議。

Purpose: To strengthen the stability of natural gas supply, the principles are meant to provide guidance for crossings between submarine cable and gas pipeline to facilitate observance by the owner/operator (“Principles”). The Crossing Party shall take initiative to reach out to the Crossed Party to sign a Crossing Agreement prior to the construction of the crossing pipeline/cable.

2.0 本原則定義之海底輸氣管線範圍：

The scope of submarine NG pipelines as defined herein:

2.1 既有海底輸氣管線（以下簡稱既有海管）。

Existing submarine NG pipeline (hereinafter the “Existing Submarine Pipeline”)

2.2 已知之未來規劃新建海底輸氣管線（以下簡稱新建海管）。

Known New Submarine Pipeline that is under planning (hereinafter the “New Submarine Pipeline”)

3.0 定義及解釋：

Definitions and Interpretation:

3.1. 海纜：「海纜」係指離岸之電力或網路通訊纜線。

“Submarine Cable” means any submarine cables transmitting electricity or communication network.

3.2. 資產：「資產」係指涉及於海床上下方之基礎建設設施，包含：海管或海纜。

“Assets” means the infrastructures above or below the seabed, including pipelines and cables.

3.3. 交錯區域：「交錯區域」係指海纜廊道及海管廊道交錯之區域。

“Crossing Area” means the area where the cable corridor crosses the pipeline corridor.

3.4. 被交錯方：「被交錯方」係指被交錯資產之所有者或營運者。

“Crossed Party” means the owner or operator of assets being crossed.

3.5. 交錯方：「交錯方」係指交錯資產之所有者或營運者。

“Crossing Party” means the owner or operator of new assets crossing existing assets.

3.6. 交錯點：「交錯點」係指交錯方及被交錯方資產彼此交錯之位置。

“Crossing Point” means the specific location two assets are crossing each other.

3.7. 工程作業：「工程作業」係指交錯區域之資產設計、建造、鋪設工法、探勘和檢測工作。

Construction Work means the relevant activities for establishing the crossing, including design, construction, installation, investigation, and survey.

- 3.8. 海管保護：海管保護包含以下形式，主要的功能為保護海管整體避免外部威脅，下述方法適用於海管懸空支撐、在交錯處上下兩者之間的分隔及增加海管之穩定性、或作為一般海管穩定性之使用、作為管線整體位移之抑制點等功能。

Pipeline Protection: Submarine pipeline often uses the following approaches to protect the pipeline from external threats, such as free-span support, to provide a permanent isolation layer between crossing and crossed assets in the crossing point, increase the pipeline stability, and act as a suppressor to pipeline displacement.

- 3.8.1 土壤覆蓋。

Soil cover.

- 3.8.2 礫石支撐及覆蓋，已可為永久隔離層構造物。

Gravel supports and covers which can be used as permanent protection layer.

- 3.8.3 拋石。

Rock dumping.

- 3.8.4 地工毯，為永久隔離層構造物。

Concrete mattresses which can be used as permanent protection layer.

- 3.8.5 沙袋或其他經評估後可達穩定的工法等。

Sand bags or other reliable and stable installations.

- 3.9. 交錯協議：指交錯雙方(交錯方與被交錯方)之間所訂定之協議書。

Crossing Agreement : The agreement for crossing assets between Crossing Party and Crossed Party.

- 4.0 既有海管原則，適用於交錯方（新鋪設海纜）與被交錯方（既有海管）：

Rules for the Existing Submarine Pipeline, applicable to the Crossing Party (for the crossing cable) and the Crossed Party (for the crossed pipeline) :

- 4.1 交錯方通過被交錯方時，應參考國際規範及指引規定，交錯點之永久隔離層應大於30公分，交錯角度應界於60度至90度且不得小於60度，於交錯區域及交錯點施工前、中、後之調查、海管保護及施工規劃與程序等具體細節，需經被交錯方同意後，方可進行交錯協議簽署。

When the Crossing Party crosses the Crossed Party, the design shall follow relevant international standards and guideline, there shall be a permanent protection layer greater than thirty centimeters (30 cm) between crossed pipeline and crossing cable during the whole lifecycle, and the crossing angle shall not be less than 60 degree (better to be between 60 to 90 degree); the pre-, during and post-survey for the crossing area, crossing point, pipeline protection design and installation procedures need to be confirmed by the Crossed Party before signing the Crossing Agreement.

- 4.2 交錯方於交錯協議簽署前，應需考量是否將有跨越新建海管情形，若有，應同意本原則第5點之各項條款，並於交錯協議內容明確載明後，方可進行交錯協議簽署。

The Crossing Party shall evaluate if the cable is subjected to be crossed by the New Submarine Pipeline. If yes, both Crossing Party and Crossed Party shall agree the Article 5 below and clearly indicate in the Crossing Agreement before the Crossing Agreement is signed.

- 4.3 交錯方應於交錯協議簽署前，提供被交錯方其交錯工法、海管保護及工程作業相關資訊文件予以被交錯方審查，並經由具經驗之國際第三方驗證公司(Project Certification公司)/或國際海事驗證擔保公司(Marine Warranty Survey公司)審查核可；另於交錯區域現場作業時，需指派具經驗及能力之國際第三方驗證公司/或國際海事驗證擔保公司於現場監督作業。

Before both Parties sign the Crossing Agreement, the Crossing Party shall provide the Crossed Party with relevant information for crossing design, pipeline protection methodology and construction work, which has been reviewed and verified by international and experienced Project Certification company/or independent Marine Warranty Survey company. The Crossing Party shall also mobilize experienced Project Certification company/or independent Marine Warranty Survey company to observe onsite Works.

- 4.4 有關雙方資產安全問題，可藉由協商，訂定施工原則及賠償條件並載入交錯協議。Regarding the assets safety issue, the installation methodology, liability, and indemnity can be negotiated by both Parties and indicated in the Crossing Agreement.

- 4.5 交錯方於其預訂鋪設施工起始之二十八日前，應自行負擔費用，自行執行或安排他人執行施工前勘測，以確定被交錯方之資產位置。

28 days prior to the expected date of Crossing Party commencing construction work, the Crossing Party shall at its own expense carry out or procure the carrying out of a Pre-construction Survey to determine the exact location of the Crossed Party's assets.

- 4.6 交錯方鋪設施工時，當施工作業船隻於被交錯方資產距離500公尺範圍內作業時，被交錯方得派遣代表至交錯方之作業船觀察相關作業，交錯方應於完工後提供文件，供被交錯方備查。

During the installation, the Crossed Party may dispatch representative to examine the construction work on Crossing Party's working vessels when the construction vessel works within the distance of five hundred meters (500m) to the Crossed Assets. Crossing Party shall provide as-built documents for record upon completion of the works.

5.0 新建海管原則，適用於交錯方（新鋪設海管）與被交錯方（既有海纜）：

Rules for the New Submarine Pipeline, applicable to the Crossing Party (for the crossing pipeline) and the Crossed Party (for the crossed cable).

- 5.1 以交錯方提供之完整計畫敘述、時程、路徑及座標為前提，被交錯方同意於交錯區域目標埋設深度應達海床下2.7公尺(平均海床平面(MSL)至海纜頂(DOL))。於雙方簽署交錯協議且在符合第5.3條及5.4條之前提下，被交錯方應同意交錯方得於交錯區域使用噴挖施工之海管埋設方式。被交錯方應於被交錯海纜完工後提供交錯方埋設深度相關數據，該數據以被交錯海纜完工當時之資訊為準，如有第5.2條之適用或若埋設深度及雙方資產距離嗣因地球物理、土工土木、考古變動而減少者，不構成被交錯方違反本原則之規定。

Subject to Crossing Party providing full project description timeline, route, and coordinate, the Crossed Party shall agree to a target burial depth of 2.7 meters (from seabed (MSL) to cable top (DOL)) in the Crossing Area. Subject to a Crossing Agreement agreed by both Parties before commencement of the work and compliance with section 5.3 and section 5.4 described below, the Crossed Party can agree, that Crossing Party uses Mass flow excavation methodology to bury the pipeline. The Crossed Party has, at the time when the construction of the crossed cable was completed, provided to Crossing Party as-built data verifying the achieved burial depth, and such data shall prevail; **in case Section 5.2 is applied**, or if the burial depth and the

distance between two parties' assets reduce overtime due to geophysical, geotechnical, or archeological changes, such reduction shall not constitute Crossed Party's breach of this section.

- 5.2 如被交錯方因例如地球物理、土工土木、考古等限制而無法將海纜埋設至目標深度2.7公尺時，交錯方將調整海管鋪設及交錯設計。

If Crossed Party is unable to reach the target burial depth of 2.7m DOL due to limitations or constraints such as geophysical, geotechnical, archeological, etc., Crossing Party should adjust the pipeline installation methodology and crossing design accordingly.

- 5.3 交錯點施工作業時，交錯方通過被交錯方資產時，雙方資產應至少保持1.3公尺間距，並應包含0.3公尺永久隔離層，且交錯方所設置之永久保護層應距離被交錯方資產至少1公尺。該數據以交錯海管完工當時之資訊為準，若雙方資產距離嗣因地球物理、土工土木、考古變動而減少者，不構成交錯方違反本原則之規定。

When Crossing Party passes/crosses the Crossed Party's assets, a distance of at least 1.3m including a 0.3m permanent protection layer between Installation Assets shall be maintained, and a distance of at least 1m between the permanent protection layer that Crossing Party installs, and Crossed Party's assets shall be maintained. As-built data shall prevail; if the distance between two parties' assets reduce overtime due to geophysical, geotechnical, or archeological changes, such reduction shall not constitute Crossing Party's breach of this section.

- 5.4 交錯方應於交錯協議簽署前，提供被交錯方其交錯工法、海纜保護及工程作業相關資訊文件予以被交錯方審查，並經由具經驗之國際第三方驗證公司(Project Certification公司)/或國際海事驗證擔保公司(Marine Warranty Survey公司)審查核可；另於交錯區域現場作業時，需指派具經驗及能力之國際第三方驗證公司/或國際海事驗證擔保公司於現場監督作業。

Before both Parties sign the Crossing Agreement, Crossing Party shall provide the Crossed Party with relevant information for crossing design, cable protection methodology and construction work, which has been reviewed and verified by international and experienced Project Certification company/or independent Marine Warranty Survey company. The Crossing Party shall also mobilize experienced Project Certification company/or independent Marine Warranty Survey company to observe onsite works.

- 5.5 交錯方於其預訂鋪設施工起始之二十八日前，應自行負擔費用，自行執行或安排他人執行施工前勘測，以確定被交錯方之資產位置。

28 days prior to the expected date of Crossing Party commencing construction work, the Crossing Party shall at its own expense carry out or procure the carrying out of a Pre-construction Survey to determine the exact location of the Crossed Party's assets.

- 5.6 交錯方鋪設施工時，當施工作業船隻於被交錯方資產距離500公尺範圍內作業時，被交錯方得派遣代表至交錯方之作業船觀察相關作業。交錯方應於完工後提供文件，供被交錯方備查。

During the installation, the Crossed Party may dispatch representative to examine the construction work on Crossing Party's working vessels when the construction vessel works within the distance of five hundred meters (500m) to the Crossed Assets. Crossing Party shall provide as-built documents for record upon completion of the works.

6.0 賠償：

Indemnities：

交錯方鋪設施工時，若損害被交錯方資產，應依雙方簽署交錯協議內容，由交錯方負責後續對被交錯方之損害賠償事宜。

During the crossing installation, if the crossed party's assets are damaged, the crossing party shall be responsible for the follow-up compensation according to the contents of the Crossing Agreement signed by both parties.

7.0 可參考之規範：

Reference Standards:

- 7.1 DNV-ST-N001 Marine Operations and Marine Warranty
- 7.2 DNV-ST-F101 Submarine Pipeline Systems
- 7.3 DNV-RP-0360 Subsea Power Cable in Shallow Water
- 7.4 DNV-ST-0359 Sub-sea Power Cable for Wind Power
- 7.5 ICPC Recommendation no.3 Criteria to be Applied to Proposed Crossings of Submarine Cables and/or Pipelines
- 7.6 ICPC Recommendation no.6 Recommended Actions for Effective Cable Protection (Post Installation)
- 7.7 0800-SW-08 中油公司天然氣海管與海管或海纜交錯處規範
0800-SW-08 CPC's Regulation for Crossing between Submarine Pipelines and Cables

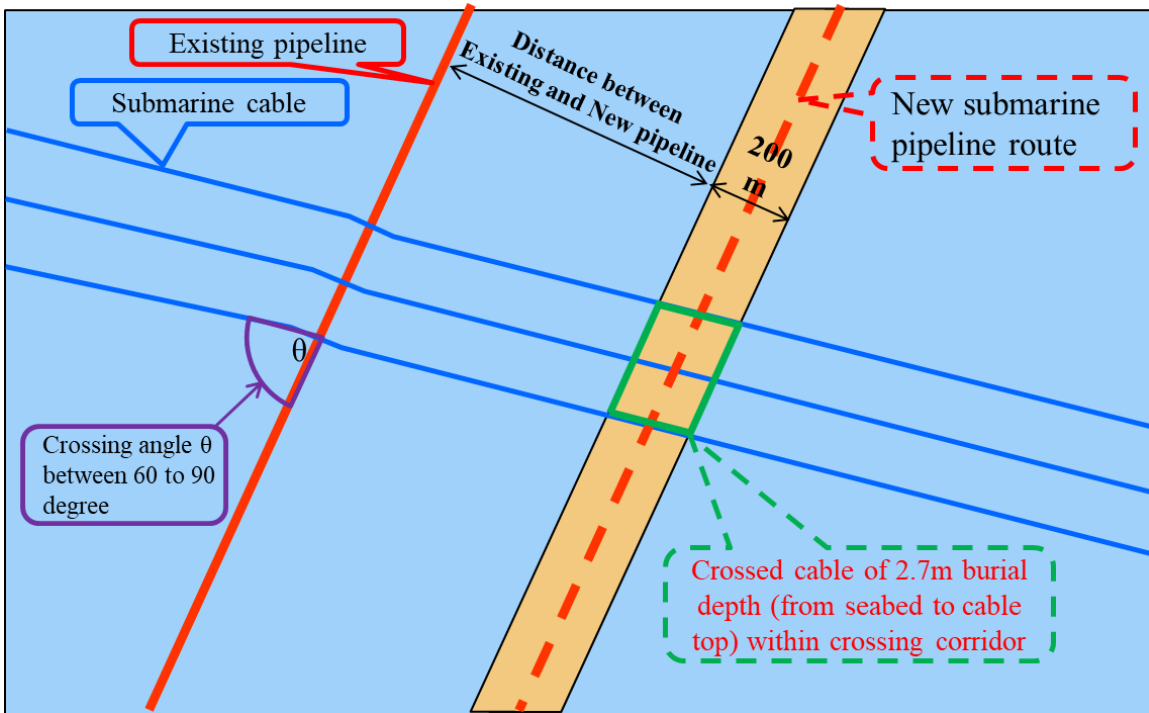
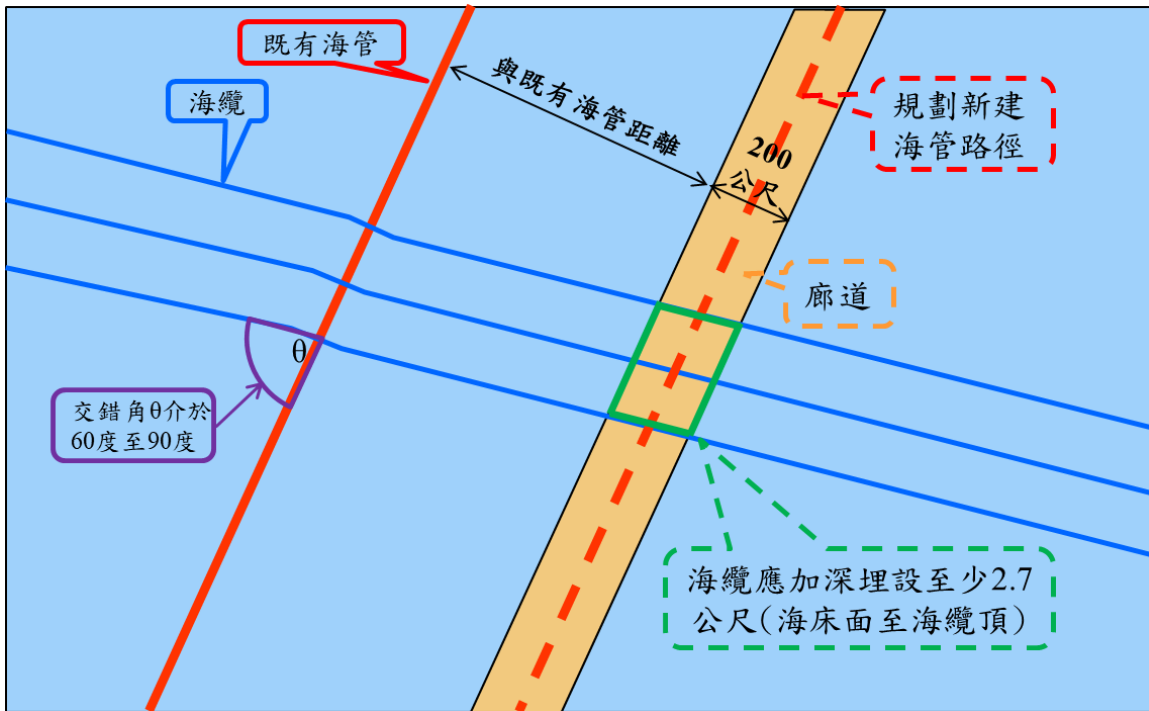
8.0 參考示意圖：

Schematic Diagram:

- 8.1 鋪設海纜與既有/預計新建海管交錯角及交錯區域示意圖
The Crossing Area and the Crossing Angle of Cables and Pipelines
- 8.2 交錯區域內海纜埋設2.7公尺示意圖
Target Burial Depth of 2.7 meters for Crossed Cables in the Crossing Area
- 8.3 海纜跨越既有海管鋪設示意圖
Cable Installation when Crossing Existed Pipeline

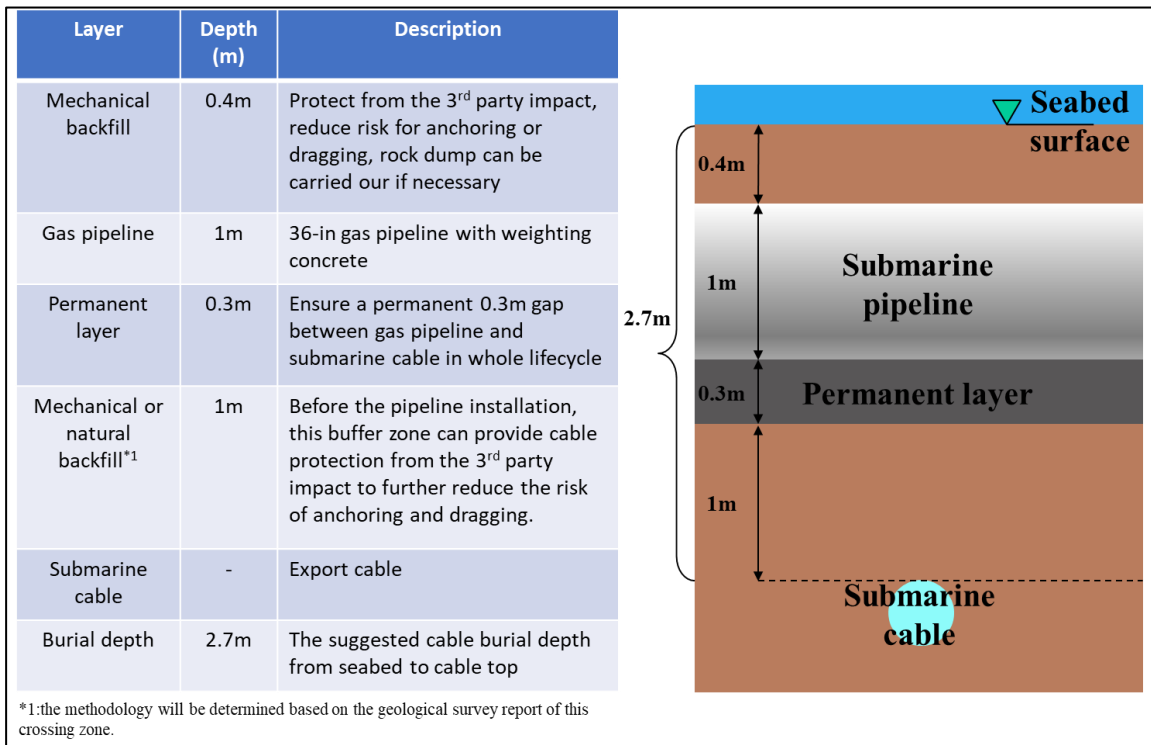
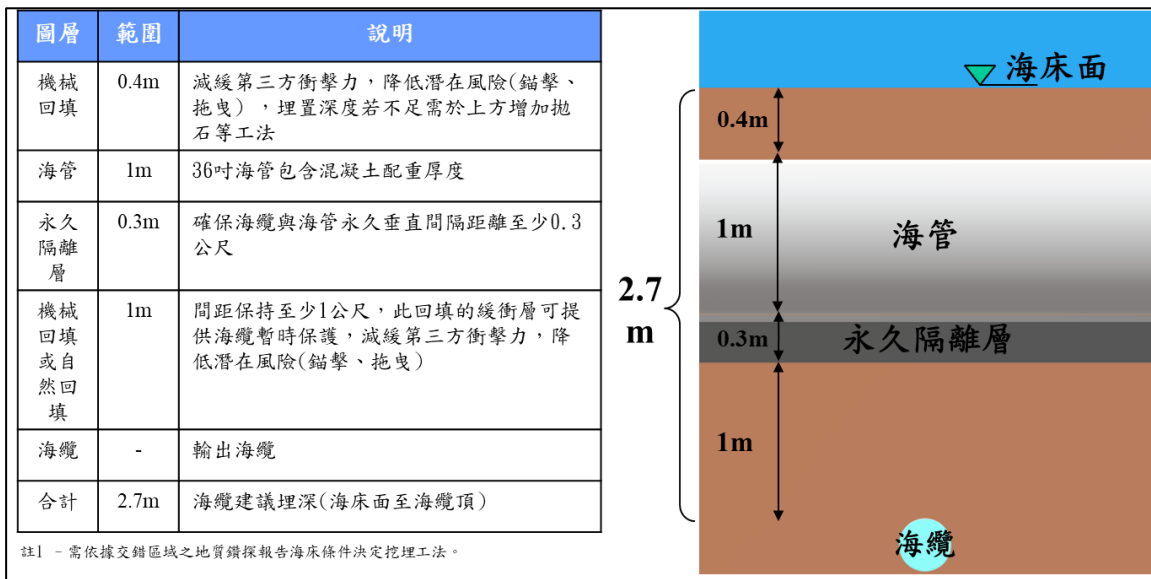
8.1 鋪設海纜與既有/預計新建海管交錯角及交錯區域示意圖

The Crossing Angle of Cables and Pipelines and the Crossing area



8.2 交錯區域內海纜埋設2.7公尺示意圖

Target burial depth of 2.7 meters for Crossed Cables in the Crossing Area



8.3 海纜跨越既有海管鋪設示意圖

Cable Installation when Crossing Existed Pipeline

