CR

中國驗船中心

創立於 1951

離岸風場認證規範 2016

RULES FOR THE CERTIFICATION OF OFFSHORE WIND FARMS 2016

中英文對照版

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REVISION HISTORY

(This version supersedes all previous ones)

Revision No.	Editor	Date (yyyy - mm)
001	Wind Energy Section	2016-05

第 1 章　適用 Application

1.1　範圍 Scope

本規範係針對離岸風場之檢驗與認證，規定其認證項目及範圍，和所需提交的相關文件及證書。若客戶申請陸域風場或由浮體式風力機組成之離岸風場之檢驗與認證，財團法人中國驗船中心將根據本規範裁訂適用之服務範圍和審查文件。

This rule aims to regulate certification items, scope and other relevant documents as well as certificates which should be necessarily submitted with regard to inspection and certification of offshore wind farms. If the clients apply for the inspection and certification of onshore wind farms or offshore wind farms composed by floating wind turbines, CR Classification Society (hereinafter referred to as the Society) will tailor an applicable scope of work as well as the document for review.

1.2　縮寫與名詞定義 Terms and definitions

1. 章程 code

2. 試營運監督 commissioning surveillance
   包含功能性安全確認、連接風力機至電網和執行操作之監督過程。
   surveillance process that encompasses functional safety checks, connecting the wind turbine to the grid and putting it into operation

3. 設計依據 design basis

4. 大地工程條件 geotechnical condition

5. 使用壽命 lifetime
   風力機或支撐結構存在之期間。
   the period of time during which wind turbines or support structures exist

6. 負載等級 load level

7. 負載分析 load analysis

8. 海洋環境條件 marine condition
   可能影響風力機行為之海洋環境特性(波、海流、水位、海冰、海生物成長、海床移動和淘刷等)。
   characteristics of the marine environment (waves, sea currents, water level, sea ice, marine growth, seabed movement and scour, etc.) which may affect the wind turbine behaviour

9. 量測追溯性 measurement traceability

10. 操作單位 operating body

11. 專案認證 project certification

    認證單位給予書面保證之程序，以確認一架以上之特定風力機包含支撐結構及可能的其他裝置符合特定場址之要求。

    procedure by which a certification body gives written assurance that one or more specific wind turbines including support structure and possibly other installations are in conformity with requirements for a specific site

12. 功率性能 power performance

    風力機產生電力及電能容量之量測。

    measure of the capability of a wind turbine to produce electric power and energy

13. 修理、改裝、更換 repair, modification, replacement (RMR)

    修理係指元件或設備修理至其初始設計/規格；
    改裝係指新裝置或更改現有之裝置，其與初始設計/規格不同。
    更換係指更換元件或設備，其符合初始設計/規格。

    repair of a unit or a piece of equipment to its original design/specification
    a new installation or changes to an existing installation, which changes the original design/specification
    replacement of a unit or a piece of equipment in conformance with its original design/specification

14. 轉子及機艙組 rotor/nacelle assembly (RNA)

    由支撐結構搭載之風力機部件，參見圖 1-1。

    part of a wind turbine carried by the support structure, see Fig. 1-1

15. 特定場址 site-specific

16. 支撐結構 support structure

    包含塔架、下層結構和基樁之離岸風力機部件，參見圖 1-1。

    part of an offshore wind turbine consisting of the tower, sub-structure and foundation, refer to Fig. 1-1

17. 監督 surveillance

    連續監控與驗證各程序、產品與營運之狀態，以及關於參考文件之記錄分析以確認符合指定的要求。

    continuing monitoring and verification of the status of procedures, products and services, and analysis of records in relation to referenced documents to ensure specified requirements are met

18. 型式認證 type certification

    認證單位給予書面保證之程序，確認風力機型式符合指定之要求。

    procedure by which a certification body gives written assurance that a wind turbine type conforms to specified requirements

19. 氣候窗 weather windows

    環境條件允許執行特定的海事操作之時間區間。
    interval of time during which the environmental conditions allow for execution of a specified marine operation

20. 停工時間 weather downtime

環境條件過於嚴苛而不允許執行指定的海事操作之一個或多個時間區間。
one or more intervals of time during which the environmental conditions are too severe to allow for execution of a specified marine operation

21. 風力機 wind turbine

將風能轉換為電能之系統。
風力機用於離岸風場專案認證者，其僅限於轉子及機艙組、電氣裝置與位於塔柱內部之次結構。

system which converts kinetic energy in the wind into electrical energy.
For wind turbines in an offshore wind farm project subject to Project Certification, the wind turbine is limited to the rotor/nacelle assembly (RNA) and the electrical installations and secondary structures located inside the tower.

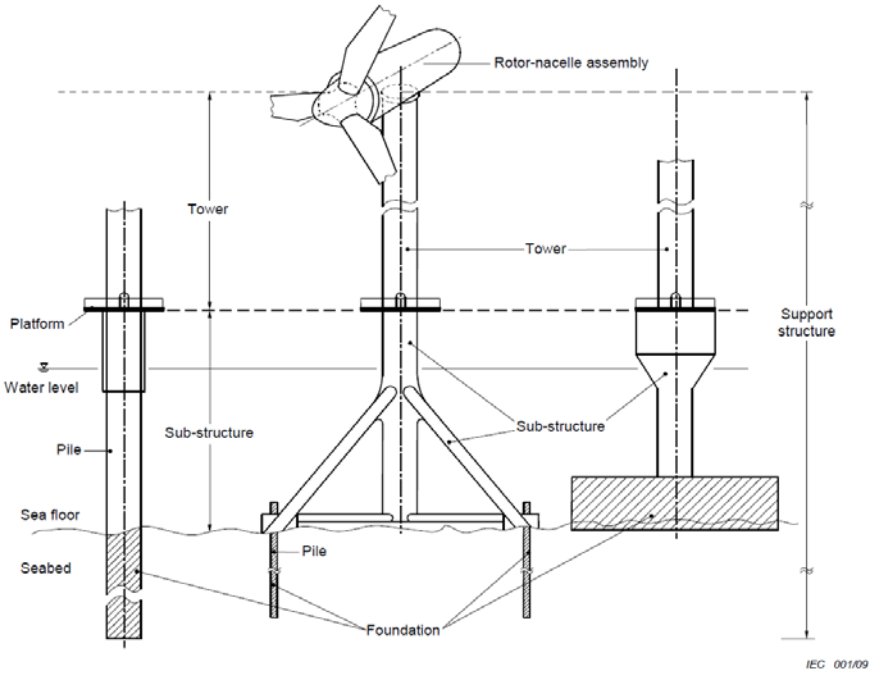

圖 1-1 固定式離岸風力機之支撐結構 [5]
Fig. 1-1 Support structure of fixed offshore wind turbine [5]

1.3　引用標準 Normative references

下列標準因本規範所引用，成為本規範之一部分。如有加註年份之版次，不適用於其後之修訂版(包括增修內容)。無加註年份者，適用該標準之最新版(包括增修內容)。

The following referenced standards make up part of this rule. For references dated in Anno Domini year, only the edition cited applies and the revision won't be applied (including any amendments). For references not dated in Anno Domini year, the latest edition of the reference standard (including any amendments) applies.

[1] IEC 61400-22 :Wind turbines-Conformity testing and certification

[2] IEC 60050-415, International Electrotechnical Vocabulary-Part 415: Wind turbine generator systems

[3] IEC 61400 (all parts), Wind turbines

[4] IEC 61400-1, Wind turbines – Part 1: Design requirements

[5] IEC 61400-3:2009, Wind turbines – Part 3: Design requirements for offshore wind turbines

[6] IEC 61400-12-1, Wind turbines- Part 12-1: Power performance measurements of electricity producing turbines

[7] IEC/TS 61400-23, Wind turbine generator systems- Part 23: Full-scale structural testing of rotor blades

[8] ISO/IEC 17020, General criteria for the operation of various types of bodies performing inspection

[9] ISO/IEC 17021, Conformity assessment- Requirements for bodies providing audit and certification of managenment systems

[10] ISO/IEC 17025, General requirements for the competence of testing and calibration laboratories

[11] ISO/IEC Guide 2: Standardization and related activities- General vocabulary

[12] ISO 9001:2008, Quality mangement systems- Requirements

[13] IEC 61400-11, Wind turbines - Part 11: Acoustic noise measurement techniques

第 2 章　專案認證 Project Certification

2.1　通則 General

專案認證之目的為評估經型式認證的風力機(Wind turbine)其支撐結構及基座設計符合外部條件、適用的結構和電氣等章程以及其他相關要求。風力機若未取得型式認可證書，則在專案認證過程中風力機型式認可的強制性模組(如圖 2-1)仍須滿足，因此在專案認證中須評估此風力機符合特定專案及場址條件。本中心須評估審核特定場址之風況、其他環境條件、電網狀況及場址土壤特性是否與設計文件中風力機型式和基座等相關條件相符。此評估也包含安全和品質的考量。

The purpose of project certification is to evaluate whether type-certified wind turbines and particular support structure/foundation(s) designs are in conformity with the external conditions, applicable construction and electrical codes and other requirements relevant to a specific site. If there is no type certificate issued for the wind turbine, the mandatory module type certificate within project certification, see Fig. 2-1, shall be fulfilled, and hence the mandatory modules of type certification covered by the project certification shall be evaluated with respect to the specific project and site-specific conditions. The Society shall evaluate whether the wind conditions, other environmental conditions, electrical network conditions and soil properties at the site conform with those defined in the design documentation for the wind turbine type and foundation(s). The evaluation includes safety and quality.

2.2　專案認證 Project certification

具備型式認證之風力機，申請專案認證時需評估的模組如下：

Project certification with type-certified wind turbines consists of the following modules:

- 場址條件評估；
  site conditions evaluation;

- 設計依據評估；
  design basis evaluation;

- 整體負載分析；
  integrated load analysis;

- 特定場址之風力機、轉子及機艙組(RNA)設計評估；
  site-specific wind turbine/RNA design evaluation ;

- 支撐結構設計評估；
  support structure design evaluation;

- 其他裝置設計評估；
  other installations design evaluation;

- 風力機、轉子及機艙組(RNA)製造監督；
  wind turbine/RNA manufacturing surveillance;

- 支撐結構製造監督；
  support structure manufacturing surveillance;

- 其他裝置製造監督；
  other installations manufacturing surveillance;

- 專案特性量測；
  project characteristics measurements;

- 運輸與安裝監督；
  transportation and installation surveillance;

- 試營運監督；
  commissioning surveillance;

- 最終評估；
  final evaluation;

- 操作與維護監督；
  operation and maintenance surveillance;

- 營運中檢驗。
  in-service survey.

專案認證證書提供所有強制性模組之符合證明文件，且亦可額外提供選擇性模組之符合證明文件，其證書之核發是基於評估報告與符合性聲明之完整性及正確性。
A project certificate documents conformity for all the mandatory modules and may additionally document conformity for optional modules. The certificate is issued on the basis of the completeness and correctness of the evaluation reports and conformity statements.

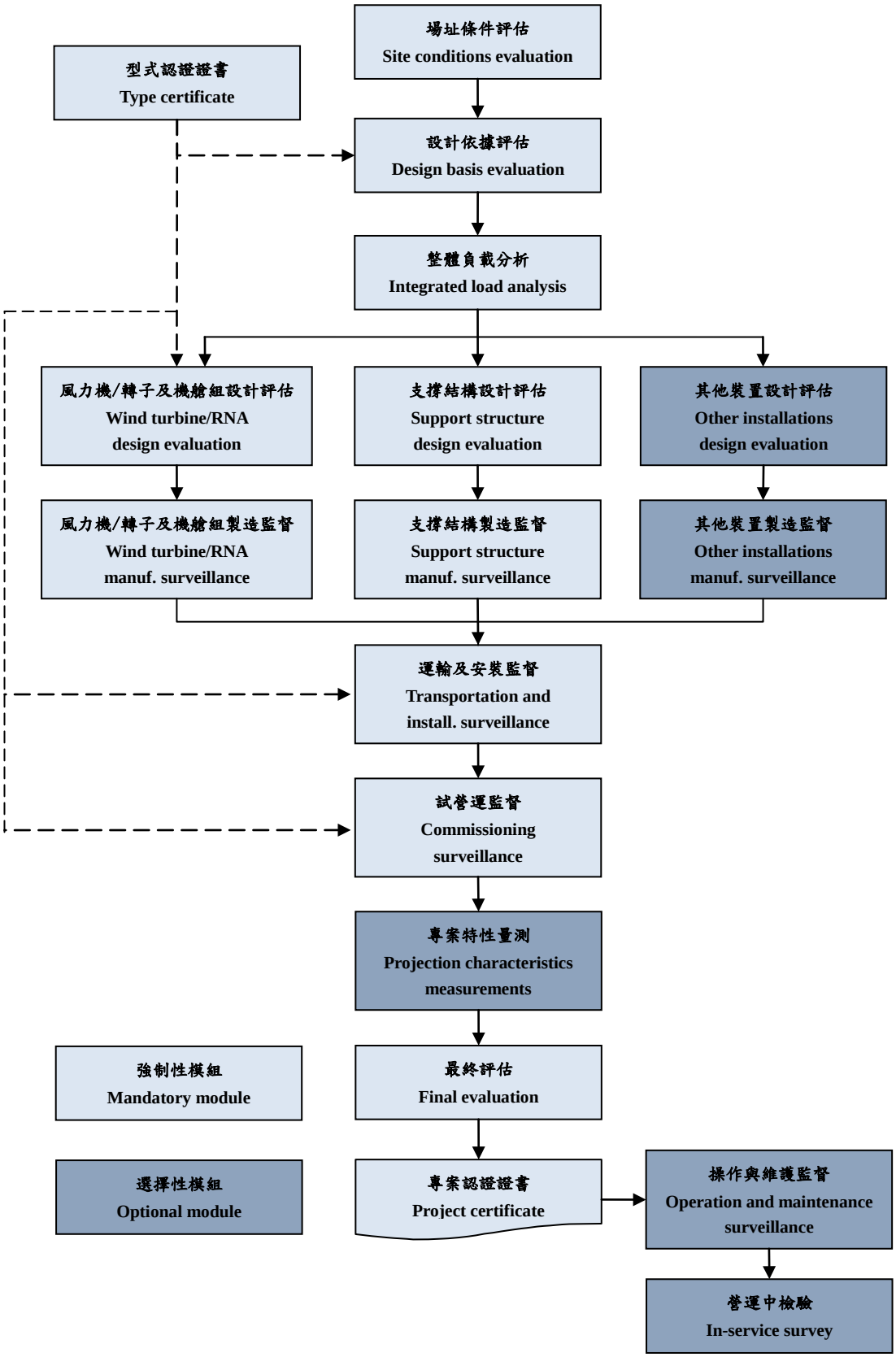

圖2-1 專案認證之模組 [1]

Fig. 2-1 Modules in project certification [1]

2.3　場址條件評估 Site conditions evaluation

2.3.1　通則 General

場址條件評估的目的是確認場址之環境、電氣及土壤的特性符合設計文件中定義的相關參數值。

The purpose of site conditions evaluation is to examine whether the environmental, electrical and soil properties at a site conform to the parameter values defined in the design documentation.

2.3.2　場址條件評估要求 Site conditions evaluation requirements

場址條件評估須適當考慮場址存在之外部條件。應考慮的外部條件項目為：

Site conditions evaluation shall be adequately assessed for the external conditions at the site. The site conditions are classified in the following categories:

- 風況；
  wind conditions;

- 其他環境條件；
  other environmental conditions;

- 地震條件；
  earthquake conditions;

- 電網條件；
  electrical power network conditions;

- 大地工程條件；
  geotechnical conditions;

- 海洋環境條件；
  marine conditions;

- 氣候窗及停工時間。
  weather windows and weather downtime.

場址條件評估可依現場量測數據為基礎，經由統計推算及/或可資應用的標準或針對安裝場址有效之方法來證明。特定場址之量測應與既有臨近位置之長期量測資料一致，特定場址觀測時間需充足以便獲得可靠資料。場址外部條件量測必須由具有 ISO/IEC 17025 認證之測試實驗室執行。其認證評估應包含以下評估：

Assessment of the site conditions may be based on site-specific measurements supported by hindcasts and/or applicable standards or methods valid for the installation site. Site-specific measurements shall normally be correlated with data from a nearby location for which long term measurements exist. The monitoring period for the site-specific measurements shall be sufficient to obtain reliable data. Measurements of the external conditions of the site shall be carried out by a testing laboratory accredited to ISO/IEC 17025. The verification shall include evaluation of:

- 測試和校正的方法；
  test and calibration methods;

- 設備；
  equipment;

- 量測追溯性；
  measurement traceability;

- 測試品質與校正結果；
  assurance of the quality of test and calibration results;

- 測試報告。
  reporting of the results.

本中心要求場址外部條件的資料擷取、分析及報告均須由合格的人員(氣象學家、工程師或地質學家)執行。
The Society shall require that qualified personnel (meteorologists, engineers or geologists) carry out the data acquisition, analysis and reporting of the external conditions at the site.

2.3.3　場址條件評估符合性聲明 Site conditions evaluation conformity statement
場址條件評估若滿足本節要求，可授予符合性聲明，此聲明包含認可的評估報告。
If the site conditions evaluation conforms to the requirements of this section, a statement of conformity attached with identification of the evaluated reports can be granted.

2.4　設計依據評估 Design basis evaluation

2.4.1　通則 General
專案之設計依據評估應檢視其設計依據具有適當紀錄且足夠之安全設計與執行。
Design basis evaluation is to examine that the design basis is properly documented and sufficient for a safe design and execution of the project.

2.4.2　設計依據之要求 Design basis requirements
設計依據應確認及包含：
The design basis shall identify and include:

- 外部條件之設計參數；
  design parameters for the external conditions;

- 設計方法和原則；
  design methodologies and principles;

- 形成本專案設計之章程與標準；
  codes and standards which form the basis for the project;

- 其他相關法令規定(如登上風力機、救援和除役)；
  other relevant statutory requirements (e.g. embarkation, rescue and decommissioning);

- 風力機型式、主要規格或含差異標示之型式認證證書；
  wind turbine type; main specifications or type certificate with identifications of deviations;

- 支撐結構之設計概念；
  support structure concept;

- 製造、運輸、安裝和試營運之要求；
  requirements for manufacturing, transportation, installation and commissioning;

- 操作與維護要求；
  requirements for operation and maintenance;

- 電網連接要求；
  requirements for grid connection;

- 其他專案之要求，如業主之要求。
  other project requirements, e.g. from the owner.

設計依據應包含所有相關之整體設計面向和參數資料，這些參數係用於計算場址之外部條件、負載、設計負載狀況，應用於負載與材料之部份安全因子、幾何公差及允許腐蝕成長量等。此設計依據應說明設計原則和方法如下所示：

The design basis shall include all relevant overall design aspects and parameters to be applied in the calculations regarding the site external conditions, loads, design load cases, partial safety factors applied on loads and materials, geometric tolerances, corrosion allowance growth. The design basis shall describe the design principles and methodology, including how the following have been established:

- 參照章程及標準；
  codes and standards;

- 外部設計參數；
  external design parameters;

- 跡流效應；
  wake effects;

- 設計負載狀況；
  design load cases;

- 負載因子和負載減少因子；
  load factors and load reduction factors;

- 模擬持續時間以及次數；
  duration of simulation as well as number of simulations;

- 極限和疲勞負載設計以及響應分析。
  extreme and fatigue design loads/response analyses.

設計依據包含相關的製造、運輸、安裝以及試營運的要求，如下所示：

The design basis shall include relevant manufacturing, transportation, installation and commissioning requirements such as:

- 參照章程及標準；
  codes and standards;

- 品質管理系統；
  quality management system;

- 與安裝相關之環境條件；
  environmental conditions relevant for installation;

- 製造、運輸、安裝和試營運手冊之要求。
  requirements for the manufacturing, transportation, installation and commissioning manuals.

設計依據中相關操作和維護的要求，如下所示：
The design basis shall include relevant operation and maintenance requirements such as:

- 參照章程及標準；
  codes and standards;

- 品質管理系統；
  quality management system;

- 檢查範圍和頻率；
  inspection scope and frequency;

- 各元件、系統和結構之預計使用壽命；
  target lifetime of components, systems and structures;

- 服務和維護手冊之要求；
  requirements for service and maintenance manuals;

- 狀態監控系統的要求；
  requirements for conditioning monitoring systems;

- 人員安全之要求。
  requirements with respect to personnel safety.

2.4.3　設計依據之符合性聲明 Design basis conformity statement
設計依據評估若滿足本節之要求，可授予符合性聲明，此聲明應包含認可的評估報告。
If the design basis conforms to the requirements of this section, a statement of conformity attached with identification of the evaluated reports can be granted.

2.5　整體負載分析 Integrated load analysis

2.5.1　通則 General
整體負載分析係確認特定場址之負載，及包含轉子機艙組、支撐結構和支撐土壤的整體風力機結構負載效應，與設計依據之符合性。
Integrated load analysis is to examine whether the site-specific loads and load effects on the integrated wind turbine structure, including the rotor-nacelle assembly plus the support structure and supporting soils, are derived in conformity with the design basis.

2.5.2　整體負載分析的要求 Integrated load analysis requirements

如與負載或負載影響相關之設計依據條件及需求比型式認驗假定之情況更好時，且風機支撐結構與特性為一致時，並不需要做進一步之負載分析。

If the conditions and requirements in the design basis regarding loads and load effects are more benign than assumed for the type certification for the wind turbine and the support structure and the wind turbine characteristics are identical, no further load analysis needs to be made.

若需執行更進一步之負載分析，申請者須完成完整的結構動力計算，並提供本中心完整的負載計算與型式證書中所推定負載之比較之文件。

If further load analyses are to be carried out, the applicant shall perform these calculations taking due account of complete structural dynamics. The applicant shall provide full documentation to the Society of the load calculations and a comparison with the loads assumed for the type certificate.

本中心須評估的項目如下：

The Society shall evaluate:

- 外部條件及設計情況的組合(如正常、故障、運輸及安裝)；
  the combinations of external conditions and design situations (e.g. normal, fault, transport, installation) ;

- 各別的部分負載安全因子；
  the respective partial load safety factors;

- 計算方法(如模擬的程序、模擬的次數以及風和浪結合負載)；
  the calculation methods, e.g. simulation procedure, number of simulations and combinations of wind and wave loads;

- 設計負載狀況所參照的場址條件、風力機操作以及安全系統；
  the design driving load cases defined with reference to the site conditions and the operation and safety system of the wind turbine;

- 特定場址之負載與型式證書中採用之負載進行比對後任何相異之處。
  any difference between the site-specific loads and the loads assumed for the type certificate.

2.5.3　整體負載分析之符合性聲明 Integrated load analysis conformity statement

場址條件評估若滿足本節要求，可授予符合性聲明，此聲明包含認可的評估報告。

If the integrated load analysis conforms to the requirements of this section, a statement of conformity attached with identification of the evaluated reports can be granted.

2.6　特定場址的風力機/轉子及機艙組之設計評估 Site-specific wind turbine/RNA design evaluation

2.6.1　通則 General

特定場址風力機的設計應進行評估以符合設計依據的要求。特定場址支撐結構在設計時，只須包含轉子及機艙組。除了風況和海洋環境條件外，亦應包含影響特定場址風力機之完整性與安全性之其他外部條件(如熱、光化學、腐蝕性、機械性、電氣或其他物理性的作用)。

The site-specific wind turbine shall be evaluated for compliance with the design basis. In the case of a site-specific support structure design, the evaluation shall only comprise the rotor/nacelle assembly (RNA). In addition to wind and marine conditions, other external conditions can affect the integrity and safety of the site-specific wind turbine, e.g. by thermal, photochemical, corrosive, mechanical, electrical or other physical action.

2.6.2　特定場址風力機設計要求 Site-specific wind turbine design requirements

風力機型式認證的條件和限制，應比對設計依據中提及之實際場址條件。比對結果應為設計文件之一部份，且應包含負載條件和其他相關條件，如下：

The wind turbine type certification conditions and limitations shall be compared to the actual site conditions as given in the design basis. This comparison shall be part of the design documentation. The comparison shall in addition to loading conditions include other relevant conditions such as:

- 溫度；
  temperature;

- 濕度；
  humidity;

- 太陽輻射；
  solar radiation;

- 雨、冰雹、雪和冰；
  rain, hail, snow and ice;

- 化學活性物質；
  chemically active substances;

- 機械活性粒子；
  mechanically active particles;

- 鹽度；
  salinity;

- 電氣條件；
  electrical conditions;

- 閃電。
  lightning.

在設計文件中須說明針對相關條件所採取的措施。結構、機械及電氣元件應在適當場址條件下設計之。防蝕系統應考慮特定場址的環境因素。須特別注意特定場址對於電氣元件的影響，如發電機、轉換器、變壓器、配電設備及外殼等。

The action taken with respect to the relevant conditions shall be stated in the design documentation. Structural, mechanical and electrical components shall be designed for the appropriate site conditions. The corrosion protection systems shall be evaluated for the site-specific environment. Special attention shall be given to the effects of the site-specific conditions on electrical components such as generator, converter, transformer, switch gear and enclosures.

風力機之電力系統須證明符合設計依據，其相關要求如下：

The electrical systems of wind turbines shall be certified for compliance with design basis, and the relevant requirements are defined as below:

- 電力系統須為對人體最小危害之設計，且在正常和極端條件下，風力機和外部電力系統在操作和維護時其潛在危險最小化；

  The design of the electrical system ensuring that minimal hazards to people as well as minimal potential damage to the wind turbine and external electrical system during operation and maintenance of the wind turbine under all normal and extreme conditions;

- 設計電力系統時，必須考慮風力機發電時所產生的波動性質；

  The design of the electrical system taking into account the fluctuating nature of the power generation from wind turbines;

- 須制定相關措施確保所有電氣元件和電力系統對腐蝕作用具充分之保護。

  Provisions made to ensure adequate protection of all electrical components and systems against the effects of corrosion.

由整體負載分析而得之特定場址負載須與型式認證使用之設計負載比對評估。任何的負載提升、振動模式或自然頻率的改變，均應仔細評估並提出報告說明，該評估應考慮負載量測、功能測試和元件測試(如葉片測試)之關聯性和有效性。此外，該評估應考慮需加強或修改的元件。

The site-specific loads resulting from the integrated load analysis have to be evaluated with respect to the design loads used in the type certification. Any increases in load level as well as any changes in vibration modes/natural frequencies shall be reported and carefully evaluated. This evaluation shall consider the relevance and validity of load measurements, functional testing and component tests such as blade test. Furthermore, the evaluation shall also identify components that will require reinforcement or modifications.

對於非完全涵蓋於風力機型式證書之任何新型式、修改或補強之元件以及任何系統，應提交設計文件。對於新型式、修改之電氣元件與系統應符合設計依據與型式認證之相關要求。

Design documentation shall be provided for any new, modified or reinforced components and systems that are not fully covered by the type certificate for the wind turbine. Design documentation for new or modified electrical components and systems shall comply with the design basis and, if relevant, also with the requirements for the type certification.

2.6.3　特定場址風力機設計符合性聲明 Site-specific wind turbine design conformity statement

特定場址風力機設計若滿足本節要求時，可授予符合性聲明。

If the site-specific wind turbine design conforms to the requirements of this section, a statement of conformity can be granted.

2.7　特定場址支撐結構設計評估 Site-specific support structure design evaluation

2.7.1　通則 General

特定場址的支撐結構(塔架、下層結構和基座)設計應評估符合認可之設計依據。如果支撐結構未包含於設計依據時，申請人可提出經本中心接受之公認標準或設計方法。在任何情況下，其安全性標準結果至少都應符合相關 IEC 61400 系列標準的預期要求，如 IEC 61400-1[4]及 IEC 61400-3 [5]的要求。

The site-specific support structure (tower, sub-structure and foundation) design shall be evaluated for compliance with the approved design basis. If the design basis does not cover the support structure, reference to a recognized standard or design method can be made by the applicant, provided this is accepted by the Society. In any event, the resulting safety level shall at least comply with the intended level in the relevant IEC 61400 series standard, i.e. IEC 61400-1 [4] or IEC 61400-3 [5].

2.7.2　特定場址支撐結構設計評估之要求 Site-specific support structure design evaluation requirements

支撐結構設計至少應須包含下列項目：

The design evaluation of the support structure shall at least include:

- 有關整體負載分析的支撐結構設計評估；
  evaluation of the design of the support structure with respect to the results of the integrated load analysis;

- 支撐結構的剛性和阻尼計算，並與負載計算中設定值互相比對；
  calculated support structure stiffness and damping as compared to the assumptions made in the load calculations;

- 以設計依據為依據的大地工程設計文件評估；
  evaluation of the geotechnical design documentation based on the design basis;

- 支撐結構設計文件的評估；
  evaluation of the design documentation for the support structure;

- 與最終安裝(永久性)支撐結構之結構完整性有關的製造計畫、運輸計畫、安裝計畫和維護計畫評估；
  evaluation of manufacturing plan, transportation plan, installation plan and maintenance plan;

- 預計採用之防蝕系統與設計依據中設計值之比對評估。
  evaluation of proposed corrosion protection system(s) against design premises specified in the design basis.

涉及大地工程之支撐結構設計文件應需至少包含設計圖檔、元件清單、製造規範和設計計算書，文件中可包含量測及測試報告。本中心要求文件中須詳細標示設計依據及認可的章程、標準、負載和相關外部條件。
The design documentation for the support structure including documentation of the geotechnical aspects shall at least include design drawings, part lists, manufacturing specifications and design calculations, which may be combined with measurement/test reports. The Society shall require that the documentation clearly identifies the design basis and agreed codes and standards, as well as loads and relevant external conditions.

2.7.3　支撐結構設計的符合性聲明 Support structure design conformity statement
支撐結構設計若滿足本節要求時，可授予符合性聲明。
If the support structure design conformity statement conforms to the requirements of this section, a statement of conformity can be granted.

2.8　其他裝置設計評估 Other installations design evaluation

2.8.1　通則 General
專案認證中可包含其他裝置，如變電站或電纜等。此類設計評估須依照客戶指定之要求進行。此類其他裝置設計須根據認可的設計依據以及特定場址的負載及條件下的標準及規範評估。但若設計依據沒有相對應的標準及規範，申請者可因此提出經本中心接受之公認標準及設計方法。在任何情況下，其安全性應需至少符合 IEC 相關系列標準之要求，如 IEC 61400-1[4]及 IEC 61400-3[5]。
A project may comprise other Installations such as substations, cables etc, the design of which shall be evaluated as required by the client. Such other installations design shall be evaluated for compliance with the standards and other specifications in the approved design basis as well as with site-specific loads and conditions. In cases where the design basis does not do so, reference to a recognized standard or design method can be made by the applicant, provided this is accepted by The Society. In any event, the resulting safety level shall at least comply with the intended level in the relevant IEC 61400 series standard, i.e. IEC 61400-1 [4] or IEC 61400-3[5].

2.8.2　其他裝置設計評估要求 Other installations design evaluation requirements

對於其他裝置指定的安裝需設計評估者，本中心應制定相應的工作範圍並經客戶同意。其他裝置設計評估須至少包含下列項目：

For each of the identified other installation requiring design evaluation, the Socitey shall develop a scope of work to be agreed with the client. The design evaluation of the other installations shall at least include:

- 設計文件之評估；
  evaluation of the design documentation;

- 其他裝置之設計評估若與整體負載設計分析結果相關聯時須比對評估；
  evaluation of the design of the other installation with respect to the results of the integrated load analysis, if relevant;

- 大地工程設計文件若與設計依據相關聯時須比對評估；
  evaluation of the geotechnical design documentation if relevant based on the design basis;

- 提出之防蝕系統與設計依據規範須進行比對評估。
  evaluation of proposed corrosion protection system(s) against design premises specified in the design basis.

關於其他裝置之設計文件，應至少包含設計圖檔、元件清單、大地工程方面之文件(若相關時)、製造規範和設計計算書，其中設計計算書可結合量測或測試報告。在文件中必須詳細標示設計依據、認可的章程及標準，負載和外部相關條件亦須詳細說明。

The design documentation for the other installations shall at least include design drawings, parts lists, documentation of the geotechnical aspects where relevant, manufacturing specifications and design calculations that may be combined with measurement/test reports. The documentation clearly identifies the design basis and agreed codes and standards, as well as loads and relevant external conditions.

2.8.3　其他裝置設計之符合性聲明 Other installations design conformity statement

其他裝置設計若滿足本節要求時，可授予符合性聲明。

If the other installations design conforms to the requirements of this section, a statement of conformity can be granted.

2.9　風力機/轉子及機艙組之製造監督
Wind turbine/RNA manufacturing surveillance

2.9.1　通則 General

風力機型式認可是基於設計評估、型式測試及量測和製造評估，包含品質管理系統及製造檢驗之評估。其中品質管理系統評估需參照認可之 ISO 9001 系統，製造商之品質管理系統應符合 ISO 9001 且需由認證單位 [1]發證。型式認證期間之製造檢驗應只基於單一樣本。除型式認證之要求外，專案認證應包含檢驗與稽核活動，以驗證對於特定專案之風力機的製造符合認可的設計並與預期的品質一致。

The type certification of the wind turbine is based on design evaluation, type testing and measurements as well as manufacturing evaluation, including quality system evaluation and manufacturing inspection. The evaluation of quality system shall relies on the presence of a certified ISO 9001 system. The manufacturer's quality system is to be a quality management system certified by a certification body and complies with ISO 9001. The manufacturing

[1] 認證單位係指符合 ISO/IEC 17021 規定，並取得授權執行稽核與認證管理系統之組織。
Certification bodies are organizations which conform to the requirements of ISO/IEC 17021 and own the accreditation to provide audit and certification of management system.

inspection during type certification is based on one specimen only. The project certification will in addition to this include inspection/audit activities (surveillance), in order to verify that the manufacturing of wind turbines for the specific project is carried out according to the approved design and with the intended quality.

2.9.2　監督要求 Surveillance requirements

專案認證之檢驗與稽核的程度需考量每個專案及風力機型式來決定。

The extent of inspection and audits to be carried out for project certification will be evaluated for each single project and wind turbine type.

本中心應針對每一個專案裁訂檢驗服務之範圍。其範圍應包含國際標準與設計評估之要求。設計評估之要求可包含下列項目：

The Society will tailor a scope of work for inspection service. This scope will include use of international standards together with input from the design evaluation. Such input from the design evaluation may be.

- 設計評估中指出之關鍵項目及製程；
  critical items/processes identified during the design evaluation;

- 產品系列生產時之測試計畫與程序；
  test programs/procedures for serial production;

- 認可的設計文件，如圖檔和規格；
  approved design documentation such as drawings and specifications;

- 原型測試之細節。
  details from prototype testing.

下列項目通常影響檢驗之細部範圍：

The following items will typically influence the detailed scope for the inspection service:

- 製造商對於風力機特定元件之出貨經驗；
  the manufacturer’s experience with respect to delivery of the specific item to wind turbines;

- 本中心與製造商之工作經驗；
  the Society’s experience with the manufacturer;

- 關於特定交貨之時程表與構件之數量；
  time schedule and number of items for the specific delivery;

- 生產工廠的數量；
  number of production plants;

- 製程方法，如手積製程或是真空注入的積層板，手動或自動銲接等；
  type of manufacturing process, e.g. hand lay-up or vacuum injection of laminates, manual or automatic welding;

- 品質控管型式，如非破壞檢驗或目視檢驗，統計方法或測試個別項目；
  type of quality control e.g. NDT or visual inspection, statistical methods or testing each item;

- 關於特定製造及控管措施，製造商品質管理系統之適當性；
  appropriateness of the manufacturer's quality system in relation to the specific manufacturing process and control activities;

- 採購之檢驗範圍，如製造商對於下游供應的檢驗；
  extent of inspection by purchaser, e.g. manufacturer's inspection on case of subsupplies;

- 對於指定之品質要求具備證明文件；
  availability of certified documents specifying the quality requirements;

- 製造章程及標準，如國家或國際標準；
  manufacturing codes and standards applied, e.g. national or international;

- 具備相關品質管理文件，如最終製造文件、測試程序、驗收測試程序、非破壞檢驗程序、銲接程序、防蝕保護、搬運、固化、熱處理及機械測試等要求；
  availability of relevant quality control documents such as requirements for final manufacturing documentation, test programs, acceptance test procedures, NDT procedures, weld procedures, corrosion protection, handling, curing, heat treatment, mechanical testing requirements;

- 便於聯繫生產設施之下游廠商及取得其製造文件；
  access to the manufacturing facility's sub-suppliers and manufacturing documents;

- 與要求有偏差之處理程序，如豁免程序。
  procedures for handling of deviations to requirements, e.g. waiver procedures.

2.9.3　風力機轉子及機艙組之製造監督符合性聲明
Wind turbine/RNA manufacturing surveillance conformity statement

本中心須評估驗証報告、檢驗報告及監督報告符合要求後核發符合性聲明。

The Society shall issue a conformity statement based on a satisfactory evaluation of verification, inspection and surveillance reports.

2.10　支撐結構製造監督
Support structure manufacturing surveillance

2.10.1　通則 General

專案認證應包含檢驗與稽核，以確認特定專案中支撐結構之製造符合認可之設計要求且達到期望之品質。製造監督之前提為支撐結構或其主構件之製造商係於品質管理系統運作下進行製造，其中品質管理系統評估需參照認可之 ISO 9001 系統，製造商之品質管理系統應符合 ISO 9001 且需由認證單位 [2]發證。檢驗與稽核應專注於製造過程品管系統之實行並評估品管系統之合適性。

The project certification shall include inspection/audit activities in order to verify that the manufacture of support structure(s) for the specific project is carried out according to the approved design and with the intended quality. It is a precondition for the manufacturing surveillance of the support structure that the manufacturer of the support structure

[2] 認證單位係指符合 ISO/IEC 17021 規定，並取得授權執行稽核與認證管理系統之組織。
Certification bodies are organizations which conform to the requirements of ISO/IEC 17021 and own the accreditation to provide audit and certification of management system.

or the main parts of the support structure operates a quality system. The evaluation of quality system shall relies on the presence of a certified ISO 9001 system. The manufacturer's quality system is to be a quality management system certified by certification body and complies with ISO 9001. The inspection/audit activities shall focus on the quality system implemented during manufacture and evaluate that the quality system is appropriate.

2.10.2　監督要求 Surveillance requirements

檢驗與稽核之範圍應取決於個別專案，下述製程可為評估之項目：

The extent of inspections and audits to be carried out for a project certification shall be determined for each project. The following processes may be subject to evaluation, depending on the type of structure:

- 鋼板之製造；
  manufacture of steel plates;

- 主承載鋼結構之製造；
  manufacture of primary load-carrying steel structure;

- 次要鋼結構之製造，如平台、樓梯等；
  manufacture of secondary steel structure (deck, ladders etc.);

- 混泥土結構之建造。
  build of concrete structures.

針對以上各項製程，本中心應裁訂檢驗服務之範圍，其範圍應包含國際標準與設計評估之要求。設計評估之要求可為：

For each of these processes, the Society shall tailor a scope of work for inspection service. This scope shall include utilisation of international standards together with input from the design evaluation. Such input from the design evaluation may be:

- 最終設計文件標示之重要元件或製程；
  critical items/processes identified during the verification of final design documentation.

- 已認可之設計文件，如設計圖檔和規格。
  approved design documentation such as drawings and specifications.

此外，下列項目也會影響檢驗之細部範圍：

The following items will also typically influence the detailed scope for the inspection service:

- 製造商對於支撐結構中特殊構件之製造經驗；
  the manufacturer’s experience with respect to delivery of the specific item for incorporation in support structures;

- 本中心與製造商之工作經驗；
  the Society’s experience with the manufacturer;

- 關於特定交貨之時程表與構件之數量；
  time schedule and number of items for the specific delivery;

- 生產工廠之數量；
  number of production plants;

- 製程之型式，如手積製程或是真空注入的積層板，手動或自動銲接等；
  type of manufacturing process, e.g. hand lay-up or vacuum injection of laminates, manual or automatic welding, etc.;

- 品質控管之型式，如非破壞檢驗、目視檢查、統計方法或測試各別項目等；
  type of quality control, e.g. NDT or visual inspection, statistical methods or testing each item, etc.;

- 關於特定製造及控管措施，製造商品質管理系統之適當性；
  appropriateness of the manufacturer's quality system in relation to the specific manufacturing process and control activities;

- 採購之檢驗範圍，如製造商對於下游供應之檢驗；
  extent of inspection by purchaser, e.g. manufacturer's inspection on case of subsupplies;

- 對於指定之品質要求具備證明文件；
  availability of certified documents specifying the quality requirements;

- 製造章程及標準，如國家或國際標準；
  manufacturing codes and standards applied, e.g. national or international;

- 具備相關品質管理文件，如最終製造文件、測試程序、驗收測試程序、非破壞檢驗程序、銲接程序、防蝕保護、搬運、固化、熱處理及機械測試要求等；
  availability of relevant quality control documents such as requirements for final manufacturing documentation, test programmes , acceptance test procedures, NDT procedures, weld procedures, corrosion protection, handling, curing, heat treatment, mechanical testing requirements, etc.;

- 便於聯繫生產設備之下游廠商和取得其製造文件；
  access to the manufacturing facility's sub-suppliers and manufacturing documents;

- 與要求有偏差之處理程序，如豁免程序。
  procedures for handling of deviations to requirements, e.g. waiver procedures.

2.10.3　支撐結構製造監督符合性聲明 Support structure manufacturing surveillance conformity statement

本中心須評估驗証報告、檢驗報告及監督報告符合要求後核發符合性聲明

The Society shall issue a conformity statement based on a satisfactory evaluation of verification, inspection and surveillance reports.

2.11　其他裝置製造監督
Other installations manufacturing surveillance

2.11.1　通則 General

專案認證應包含檢驗與稽核，以確認特定專案中其他裝置製造符合認可之設計要求且達到期望之品質。製造監督之前提為其他裝置或其主構件之製造商係於品質管理系統運作下進行製造。檢驗與稽核應專注於製造過程中品管系統之實行並評估品管系統之合適性。

The project certification shall include inspection/audit activities that serve to verify that the manufacture of other installations for the specific project is carried out according to the approved design and with the intended quality. Other installations manufacturing surveillance shall focus on the quality system implemented during manufacture and evaluate that the quality system is appropriate.

2.11.2　監督之要求 Surveillance requirements

其他裝置(選擇之設備或整體裝置)之製造檢驗與稽核之範圍應取決於個別專案，本中心應制定客戶同意之檢驗服務範圍，其範圍應包含國際標準與設計評估之要求。設計評估之要求可為：

The extent of inspections and audits to be carried out for other installations (selected equipment or complete installations) during project certification shall be evaluated for each project. The Society shall develop a scope of work for inspection service to be agreed with the client. This scope will include use of international standards, together with data from the design evaluation. Such data from the design evaluation may be:

- 設計評估過程標示之關鍵項目/過程；
  critical items/processes identified during the design evaluation;

- 測試計畫與程序；
  test programs/procedures;

- 已認可之設計文件，如圖檔和規格。
  approved design documentation such as drawings and specifications.

下列項目可能影響檢驗服務之細部範圍，取決於設備或裝置之類型：

The following items may influence the detailed scope for the inspection service, depending on the type of equipment or installation:

- 製造商對於離岸風電專案中特殊構件之交貨經驗；
  the manufacturer’s experience with respect to delivery of the specific item to wind turbine projects;

- 本中心與製造商之工作經驗；
  the Society’s experience with the manufacturer;

- 關於特定交貨之時程表與構件之數量；
  time schedule and number of items for the specific delivery;

- 品質控管之型式，如非破壞檢驗、目視檢查、統計方法或測試各別項目等；
  type of quality control, e.g. NDT or visual inspection, statistical methods or testing each item, etc.;

- 關於特定製程及控管措施，製造商品質管理系統之適當性；
  appropriateness of the manufacturer’s quality system in relation to the specific manufacturing process and control activities;

- 採購之檢驗範圍，如製造商對於下游供應之檢驗；
  extent of inspection by purchaser, e.g. manufacturer’s inspection on case of subsupplies;

- 對於指定之品質要求具備證明文件；
  availability of certified documents specifying the quality requirements;

- 製造章程及標準，如國家或國際標準；
  manufacturing codes and standards applied, e.g. national or international;

- 具備相關品質管理文件，如最終製造文件、測試程序、允收程序、非破壞檢驗程序、銲接程序、防蝕保護、搬運、固化、熱處理及機械測試要求等；
  availability of relevant quality control documents, such as requirements for final manufacturing documentation, test programs, acceptance test procedures, NDT procedures, weld procedures, corrosion protection, handling, curing, heat treatment, mechanical testing requirements, etc.;

- 便於聯繫生產設施之下游廠商及取得其製造文件；
  access to the manufacturing facility's sub-suppliers and manufacturing documents;

- 與要求有偏差之處理程序，如豁免程序。
  procedures for handling of deviations to requirements, e.g. waiver procedures.

2.11.3　其他裝置製造監督之符合性聲明 Other installations manufacturing surveillance conformity statement

本中心須確認驗証報告、檢驗報告及監督報告符合要求後核發符合性聲明

The Society shall issue a conformity statement based on a satisfactory evaluation of verification, inspection and surveillance reports.

2.12　專案特性量測 Project characteristics measurements

2.12.1　通則 General

除了單一風力機於型式認證時之特性量測資料以外，專案認證之特性量測目的為建立特定場址中之特定風力機或風力機專案之性能相關資料。這些量測項目可由申請人選擇，但應符合 IEC 61400 系列[3]之相關標準。量測包含下述一項或多項元素：

The purpose of project characteristics measurements within project certification is to establish performance-related characteristics of a specific wind turbine or wind turbine project at a specific site, in addition to the measurements done for a single turbine within the type certification. These optional measurements may be selected by the applicant and shall conform to the relevant IEC 61400 series standards [3]. The measurements comprise one or more of the elements:

- 根據電網章程之電網連接相容性；
  grid connection compatibility according to grid codes;

- 功率特性之確認；
  verification of power performance;

- 噪音排放之確認。
  verification of acoustic noise emission.

若無 IEC 標準可適用時，則量測程序應由申請人與本中心達成共識。量測應由取得認證之實驗室執行，或本中心應至少確認其符合 ISO/IEC 17025 之標準[10]。量測和測試結果應紀錄成測試報告提交本中心評估。本中心應評估量測係依據認可之測試程序進行，且測試報告詳實記錄認證所需之特性量測資料。

In cases where applicable IEC standards are not available, the measurement procedure shall be agreed between the applicant and the Society. The measurements shall be carried out by an accredited test laboratory or the Society shall verify that the party conducting the testing complies with at least the criteria of ISO/IEC 17025 [10], as applicable.

Measurements and test results shall be documented in a test report evaluated by the Society. The Society shall evaluate that the measurements have been carried out in accordance with an approved detailed program and that the report properly documents the characteristics required for certification.

本中心評估結果滿意將會授予符合性聲明，證明該量測係依據相應之測試程序與相關之 IEC61400 系列標準[3]進行。

A satisfactory evaluation is concluded with a conformity statement issued by the Society, attesting that the measurements have been carried out in accordance with the appropriate test procedures and relevant IEC 61400 series standards [3].

2.12.2　根據電網章程之電網連接相容性 Grid connection compatibility according to grid codes

電網連接之相容性量測應經本中心評估以確認電網章程定義之特定反應狀況(例如電網故障期間之狀況)。專案認證中，本中心應藉由比對電網量測結果與電網章程定義之狀況以評估電網連接相容性。本中心亦應確認量測過程符合 IEC 61400 系列標準[3]和電網章程，且測量狀況、儀器設備、校準及分析方法皆已描述於測試報告中。上述之量測目的為建立指定場址中之特定風力機或風力機專案之電網連接相容性文件資料。

Grid connection compatibility measurements shall be evaluated by the Society to verify specified reactions (e.g. during grid fault conditions) defined in the grid codes applicable to the site. For project certification, the Society shall evaluate grid connection compatibility by comparing the measurements with the electrical network and conditions given in the grid codes. the Society shall verify that the measurement procedures conform with IEC 61400 series standards [3] and grid codes, and that the measurement conditions, instrumentation and equipment, calibrations and analyses are described in a test report. The purpose of these measurements is to document the grid connection compatibility of a specific wind turbine or wind turbine project at a specific site.

2.12.3　功率性能之確認 Verification of power performance

功率性能之測試及量測應經本中心評估以確認專案場址中包含之單一或多架風力機之電力產量。專案認證中，本中心應藉由比對測試及量測結果與客戶提供個別風力機之參考性能以評估風力機之功率性能。

本中心亦應確認測量程序符合 IEC 61400-12-1[6]標準(或其他功率評估之相關標準)，及/或符合客戶指定之要求或程序。使用之標準與程序以及評估之結果應在本中心簽署之符合性聲明中明確地引用與標示。

上述之量測目的為建立特定專案中之特定風力機或全部(或部分)風力機之功率性能文件資料。

Power performance tests and measurements shall be evaluated by the Society in order to verify the power production of one or more wind turbines included at the project site. For project certification, the Society shall evaluate the performance of the wind turbine(s) by comparing the results of the tests and measurements with the reference individual performance of the wind turbines supplied by the customer.

The Society shall also verify that the measurement procedures conform to the relevant IEC 61400-12-1 [6] standards (and any future performance assessment related standards) and/or customer defined requirements or procedures. The standards or procedures applied and the results of the evaluation shall be clearly referenced and stated in the conformity statement issued by the Society. The purpose of these measurements is to document the power performance of a specific wind turbine or of all or some of the wind turbines installed at a specific project.

2.12.4　噪音排放之確認 Verification of acoustic noise emission

噪音量測之特定噪音排放標準應由本中心評估以確認符合國際或地方法規。本中心應確認量測程序符合 IEC 61400-11 標準[13](或其他噪音相關標準)，以及其他參考標準與之符合之準則。參考標準與符合之準則應明確標示於本中心簽署之符合性聲明中。上述之量測目的為建立特定場址中之特定風力機或專案整體之噪音排放符合相關標準之文件資料。

Specific acoustic noise emission criteria for acoustic noise measurements shall be evaluated by the Society to verify compliance with the international or the local codes. the Society shall verify that the measurement procedures conform with the relevant IEC 61400-11 (and any future acoustic noise related standards) and with the reference standards and compliance criteria. The reference standards and compliance criteria shall be clearly identified in the conformity statement issued by the Society. The purpose of these measurements is to document compliance with respect to acoustic noise emission of a specific wind turbine or the project as a whole installed at a specific site..

2.12.5　測試報告 Test reports

本中心應要求專案特性量測報告符合 ISO/IEC 17025 標準[10]及其他相關標準之測試要求(如電網章程)。此外，報告內應含下列描述：

The Society shall require that the project characteristics measurement reports conform with the requirements of ISO/IEC 17025[10] and relevant standards used to define the test requirements (e.g. grid codes). In addition, descriptions as below shall be required. :

- 指定場址中特定風力機或風力機專案，包含測試風力機、序號及控制系統軟體之版本等；
  the specific wind turbine or wind turbine project at a specific site, including the test turbine(s), serial number(s) and control system software revision number(s);

- 任何未預期之意外表現。
  any significant unexpected behaviour.

最終專案特性量測報告中應載明執行認證之量測機構。

Attestation by the operating body shall be clearly marked on the final project characteristics measurement report(s).

2.12.6　專案特性量測符合性聲明 Project characteristics measurement conformity statement

本中心須確認測試報告符合要求後核發符合聲明，此聲明的內容應包含下列說明:

The Society shall issue a conformity statement based on satisfactory evaluation of the test reports. The conformity statement shall specify:

- 量測數據資料；
  the measurements carried out;

- 量測的標準；
  the measurement standards applied;

- 簽署過的測試報告。
  identification of the test report(s).

2.13　運輸及安裝監督 Transportation and installation surveillance

2.13.1　通則 General

運輸及安裝之監督之目的為確認符合設計依據之要求，並確認風力機元件及其次系統之負載在運輸及安裝過程中不超過設計包絡線與確認運輸及/或搬運可能被檢測出之損害。

The purpose of transportation and installation surveillance is to verify conformity with the requirements of the design basis and to verify that the loads on components and subsystems of the wind turbines are not exceeding the design envelope during transportation and installation and that possible transportation and/or handling damages are being detected.

2.13.2　運輸及安裝之要求 Transportation and installation requirements

若運輸及安裝作業過程之品質管理系統良好，則監督可為文書審核之方式進行。否則本中心應執行運輸及安裝監督之檢驗。

If a quality management system is in place for the transportation and installation processes, surveillance may be carried out by auditing. If not, the Society shall perform the surveillance by inspection.

本中心應評估運輸及安裝風力機作業程序之文書符合設計依據及 IEC61400 系列之相關標準。本中心應檢驗相關元件在運輸及搬運過程中可能受到之損傷，此損傷包含防蝕塗層之破壞或腐蝕。在安裝完成後應執行所有相關元件之目視檢查。在離岸風力機專案認證中，應監督之項目如下：

The Society shall evaluate from documentation whether the transportation and installation processes of the wind turbine(s) are in conformance with the design basis and the requirements in the relevant IEC 61400 series standard. The Society shall ensure that components are inspected for damage that may have occurred during transport and handling. This is including, but not limited to, damage to corrosion protection or actual corrosion. After completion of the installation, a final visual inspection of all relevant components shall be made. For offshore projects, surveillance shall include:

- 海上運輸過程之監督；
  monitoring of sea-transportation;

- 運輸與安裝過程符合可接受之天氣條件下進行；
  compliance with respect to acceptable weather conditions during transport and installation;

- 符合風力機與支撐結構之安裝程序。
  compliance with the support structure and wind turbine installation procedures.

驗證、檢驗及監督之所有活動應於報告中詳細載明。

Verification, inspection and surveillance activities shall be concluded with reports that describe the activities carried out.

2.13.3　運輸與安裝之符合性聲明 Transportation and installation conformity statement

本中心須確認驗證報告、檢驗報告及監督報告符合要求後核發符合性聲明。

The Society shall issue a conformity statement based on a satisfactory evaluation of verification, inspection and surveillance reports.

2.14　試營運監督 Commissioning surveillance

2.14.1　通則 General

試營運監督之目的為確認安裝在特定場址之風力機，其試營運符合設計文件中之相關手冊說明。

The purpose of commissioning surveillance is to verify that the wind turbines installed in a specific project at a specific site are commissioned in conformity with the relevant manuals included in the design documentation

2.14.2　試營運監督之要求 Commissioning surveillance requirements

本中心應依據 IEC61400 系列標準評估風力機之試營運符合製造商提供之說明文件。除了一般說明文件需測試之項目外，試營運期間之其他測試項目可在製造商同意下執行。此評估應審查試營運之運轉紀錄。在專案中，本中心應至少確認各別型式之單一風力機之試營運且每 50 架風力機應額外至少確認一架。

本中心至少應確認之項目如下：

The Society shall evaluate whether the commissioning of the wind turbine(s) is in conformance with the instructions supplied by the manufacturer in accordance with relevant parts of the IEC 61400 series. Other tests to be performed during commissioning in addition to tests in accordance with the general instructions may be agreed with the manufacturer.

This evaluation requires examination of commissioning records. In addition, the Society shall witness the commissioning of at least one wind turbine for a specific type and additionally at least one wind turbine per every 50 turbines in the project. The Society shall as a minimum verify that:

- 製造商提供之試營運說明文件是否足夠；

the commissioning instructions supplied by the manufacturer are adequate;

- 試營運之過程遵循製造商提供之說明文件進行；
  the instructions supplied by the manufacturer are followed during commissioning;

- 最終之試營運報告是否完整。
  the final commissioning reports are complete.

驗證與監督之活動應於報告中詳細載明。
Verification and surveillance activities shall be concluded with reports that describe the activities carried out.

2.14.3　試營運監督符合性聲明 Commissioning surveillance conformity statement
本中心須確認驗證報告、檢驗報告及監督報告符合要求後核發符合性聲明
The Society shall issue a conformity statement based on a satisfactory evaluation of verification and surveillance reports.

2.15　最終評估 Final evaluation

最終評估之目的為提供文件資料，其包含所有操作單位對於與專案認證證書相關之評估的調查結果。故除了評估報告與符合性聲明之評估外，應準備最終評估報告，包含：

The purpose of final evaluation is to provide documentation of the findings of all operating bodies involved in the evaluation of the elements of the project certificate. Following evaluation of the evaluation reports and conformity statements, the final evaluation report shall be prepared, consisting of:

- 關於專案認證證書之所有輔助元件及專案文件之參考清單；
  a reference list of all supporting product and project documentation for the project certificate;

- 核發予專案認證模組之所有符合性聲明中未完成項目之報告。
  report of all conformity statements issued for the project certification modules for outstanding issues.

最終評估報告應送交申請人且於本中心保存一份複本。
The final evaluation report shall be delivered to the applicant and a copy retained in the confidential files of the Society.

2.16　專案認證證書 Project certificate

本中心應依據完整且正確之最終評估報告及符合性聲明核發專案認證證書。專案認證證書應包含強制性模組及申請人選擇性模組。該專案認證證書有效期為五年。

The Society shall issue a project certificate based on the final evaluation for completeness and correctness of the evaluation reports and conformity statements. The project certificate shall include the results of the mandatory modules and the agreed optional modules. The projcet certificate is valid for five years.

2.17　運轉及維護監督 Operation and maintenance surveillance

2.17.1　通則 General

運轉及維護監督之目的為確認特定場址中之特定風力機或風力機專案，其運轉及維護符合設計文件中相關手冊之要求。此監督須檢查運轉及維護之紀錄，以及檢驗風力機與其他包含於專案認證中之裝置及元件。

The purpose of operation and maintenance surveillance is to establish that a specific wind turbine installation or wind turbine project at a specific site is operated and maintained in conformity with the relevant manuals included in the design documentation. This surveillance requires examination of operation and maintenance records as well as inspection of turbines and other installations and parts which are covered by the project certificate.

2.17.2　運轉及維護監督之要求 Operation and maintenance surveillance requirements

本中心應評估運轉及維護之紀錄與報告，評估項目至少應包含：

The Society shall evaluate operation and maintenance records and reports. The evaluation shall as a minimum establish that:

- 維護活動係由合格人員依照維護手冊規定之時程與內容執行；

  maintenance has been carried out by authorised and qualified personnel in accordance with and at the intervals specified in the maintenance manual;

- 確認控制參數之設定符合設計文件規定之極限值；

  the control settings have been checked with regard to conformance with the limiting values specified in the design documentation;

- 藉由審核維修、改裝及更換報告以確認所有工作符合認證要求。

  all repair, modification and replacement (RMR) has been carried out in accordance with the certificate by reviewing RMR-reports.

風場營運商之操作文件、維護手冊和維修紀錄應以相關操作人員能理解之語言發佈。檢驗報告應附加於維修手冊中。應特別注意已維修或改裝之元件以確保維修或改裝作業符合認證要求。

The operator’s instructions, maintenance manuals and maintenance records shall be issued in a language that is understood by relevant personnel. The inspection reports shall be appended to the corresponding maintenance manual. Particular attention shall be paid to repaired and/or modified components to assure that only repairs or modifications compatible with the certificate have been made.

2.17.3　運轉及維護符合性聲明 Operation and maintenance conformity statement

若運轉及維護滿足本節要求時，可授予符合性聲明及檢驗報告。

If the operation and maintenance conforms to the requirements of this section, a statement of conformity and inspection can be granted.

2.18　離岸風場營運中檢驗 In-service surveys of offshore wind farms

2.18.1　通則 General

(a) 如果在證書效期內對於場址或風力機有修改時，必須通報本中心並不得延誤。證書之有效性為期五年，若風場營運期間本中心保持連續之監督活動，且於證書有效期的每一個週年日前後三個月內執行營運中檢驗，則五年期滿時可直接換證。若無保持連續監督活動與執行營運中檢驗，則需重新認證，並重新發證。

Within effective of the certificate terms, modifications to the site or the wind turbines shall be reported to the Society without delay. The validity of project certificate is five years. If the Society continues to perform surveillance activities during operation of the wind farm for the project and conduct the in-service survey within three months before or after the anniversary date of validity of term of the certificate, client can renew the project certificate by the end of five years. If not, the wind farm need to re-certification and granted a new certificate.

(b) 營運中檢驗係指包含風力機、支撐結構和其他裝置，於整個營運壽命期間之定期檢驗。本中心將執行週期性營運中檢驗，以確認專案證書的有效性與驗證所需標準之遵守與維護。檢驗完成後，須由現場驗船師簽署證書。

The in-service survey implies an activity, by which the wind turbine, the support structure and other installations are surveyed regularly during their entire operational life. The Society will conduct periodical in-service surveys in order to validate the project certificate and to verify that the required standard is observed and maintained. After completion of in-service survey, the certificate shall be endorsed by the attending surveyor.

(c) 於檢驗開始前，維護、修理和檢查計畫書須準備妥當並提交本中心認可。計畫書應做為參與風場維護與修理的各個單位之參考。維護、修理和檢查計畫書必要時應根據任何之發現與偏差而進行更新。計畫書之任何更新應提交本中心認可。

Prior to the commencement of the survey, a Maintenance, Repair and Inspection Program shall be developed and submitted to the Society for approval. The program shall serve as a reference for parties involved in maintenance and repair carried out on the wind farm. The Maintenance, Repair and Inspection Program shall be updated as required based on findings and deviations. Any update of the program shall be subject to approval by the Society.

2.18.2 營運中檢驗 In-service survey

(a) 本中心會針對週期性營運中檢驗裁定詳細工作範圍。工作範圍將包含詳細之專案具體方案，其確認本中心要求之檢驗活動、檢驗間隔、需檢驗風力機數量和報告要求。檢驗間隔將視風力機型式和先前認證過程中建立的知識而定。風場專案完成後的第一次檢驗通常於一年後執行，其範圍將包含先前檢驗之任何未完成項目之狀態評估。

The Society will tailor a detailed scope of work for the periodical in-service surveys. The scope of work will include a detailed project specific plan that identifies the survey activities required by the Society, the survey intervals, the number of wind turbines to be surveyed and the reporting requirements. The interval between surveys will depend on the wind turbine type and on the knowledge built up during the previous phases of the certification process. The first survey after completion of the wind farm project will usually take place after one year. The scope will include assessment of the status regarding any outstanding issues from the previous survey.

(b) 本中心驗船師出具之報告將強調週期性檢驗期間紀錄之任何發現與偏差。發現與偏差將以建議方式報告予客戶。

The report issued by the attending surveyor of the Society will highlight any findings or deviations reported during the periodical survey. Findings and deviations will be reported to the client in terms of recommendations.

(c) 執行週期性檢驗以提供證據證明受檢驗之裝置與零件持續符合認可之設計。未完成項目狀態和過去一年內關於維護系統之所有調整資訊於檢驗前應提交本中心。

The periodical survey will be carried out to provide evidence as to whether the surveyed installation or parts thereof continues to comply with the approved design. Prior to the survey the status of outstanding items as well as information about all revisions made to the maintenance system within the last year shall be submitted to the Society.

(d) 自先前檢驗後執行之維護與修理記錄的審查與驗證，亦做為檢驗的一部分。負責維護與修理的公司將接受稽核以確認執行工作之文件。審查將包含：

As a part of the survey, records of maintenance and repairs carried out since the previous survey will be reviewed and verified against the program. The company responsible for the maintenance and repairs will be subject to audits in order to verify the documentation for work carried out. The review will include:

(i) 先前檢驗和關於建議狀況之未完成項目的後續行動
follow-up of outstanding issues from the previous survey and status regarding recommendations

(ii) 修訂程序之審查
review of revised procedures

(iii) 維護文件之審查
review of maintenance documentation

(iv) 檔案中或登記於電腦中的維護歷史之審查
review of maintenance history in the file or registration in the computer

(v) 基於陸域零件與系統之發現的離岸計畫準備
preparation of the offshore program, based on findings from the onshore part and systems.

(e) 離岸檢驗通常可能包含：
The surveys conducted offshore may in general include:

(i) 驗證安裝元件符合型式認證之要求
verification that installed components are in compliance with type certification requirements

(ii) 驗證根據認可之計畫書和製造商建議所執行的修理和維護
verification that repair and maintenance according to approved program and manufacturer’s recommendations are conducted

(iii) 挑選之系統與元件的一般檢驗和測試
general survey and test of selected systems and components

(iv) 結構和電纜的水下檢驗
subsea inspections of structures and cables.

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