



Annex-XV

Overview of Annex-XV

Annex-15の概要

“Decision-making for Maintenance Works
and Upgrading of Hydro Facilities”

水力発電設備の保守業務と増強に関する意思決定

4th Feb.2019

Annex-XV OA 執行責任者

J-POWER, Shingo TAKAGI 高木慎悟



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水力発電設備の保守業務
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1. Background 背景

➤ Activity of Annex-XI Annex11の活動

- Title: Renewal & Upgrading of Hydropower Plant
議題は、水力発電設備の更新と増強
- Period of activities: Sep.2010 through Mar. 2016
期間は、2010.9～2016.3
- 70 examples of good practices were collected over 10 countries, regarding renewal and upgrading of hydropower plants in order to improve economic value and safety of aged hydropower plants.
経済価値や安全性を改善するための更新・増強に関する70の好事例を収集（10ヶ国）
- Importance of the strategic asset management methods was recognized.
その中で、戦略的アセットマネジメントの重要性が認識



- Necessary to investigate those methods in detail.
詳細に調査することが必要であると判断

Annex-XV



2. Information 概要

➤ Annex Title 議題

- Decision-making for Maintenance Works and Upgrading of Hydro Facilities

水力発電設備の保守業務と増強に関する意思決定

➤ Operating Agent 執行責任者

- Japan 日本

➤ Participating Countries 参加国

- Australia, Japan, Norway オーストラリア、日本、ノルウェー

➤ Annex Task 課題

- To investigate the necessary methods and technology to be implemented in asset management and decision-making.

水力設備のアセットマネジメントについて、資産管理や意思決定の際に必要な手法や技術を調査対象。



3. Task Activities 活動目標

➤ Task Activities 活動目標

- Data on facility maintenance works and asset management will be collected from the owners and operators of hydropower plants in the participating countries.

参加国の電気事業者から設備の保守やアセットマネジメントに関する情報を収集する。

- In case any innovative approaches are found, further information will be obtained by interviews.

先進的な取り組みをしていると思われる事例について、聞き取り調査により詳細な情報を入手する。

- As an example, the appendix outlines maintenance method adopted by the Japanese electricity utilities.

一例として、日本の電気事業者で実施されている保守の方法について、添付資料で紹介する。



➤ How to proceed 調査の進め方

■ Step 1 - Methods and technologies implemented in asset management and decision-making

段階1- 資産管理や意思決定の手法と技術

A case study of asset management processes by hydropower plant owners and operators is made for the purpose of classifying and extracting methods and technologies pertaining to:

各電気事業者が実施しているアセットマネジメントの事例を収集して、下記に示すような手法や技術を分類抽出。

① Improvement of facility performance and function

設備の性能、機能の向上に関する手法・技術

- Facility maintenance methods
- new technologies utilized in facility inspection, diagnosis, life estimation, repair, renewal, etc.
- Technologies for improvement of output and efficiency
- Facility improvement measures in response to electricity market changes.
 - ・ 設備保全方法
 - ・ 設備の点検、診断、寿命予測、補修、更新等に関する新技術
 - ・ 出力や効率の向上のための技術
 - ・ 電力市場の変化に対応するための設備改善策



② Improvement of asset values

設備の価値の向上に関する手法・技術

- Risk management
- Alternative measures
- Calculation software
- Operation improvement measures in response to electricity market changes
 - ・ リスクマネジメント
 - ・ 補修、更新と比較の対象になった代替案
 - ・ アセットマネジメントのための計算ソフトウェア
 - ・ 電力市場の変化に対応するための運用方法改善策

■ Step 2 - Targets for improvement of asset value of hydro facilities

段階2 – 資産価値向上の目標

A case study from Step 1 will be analyzed to classify different characteristics of decision-making and to extract targets that play important roles in asset value improvement by means of asset management.

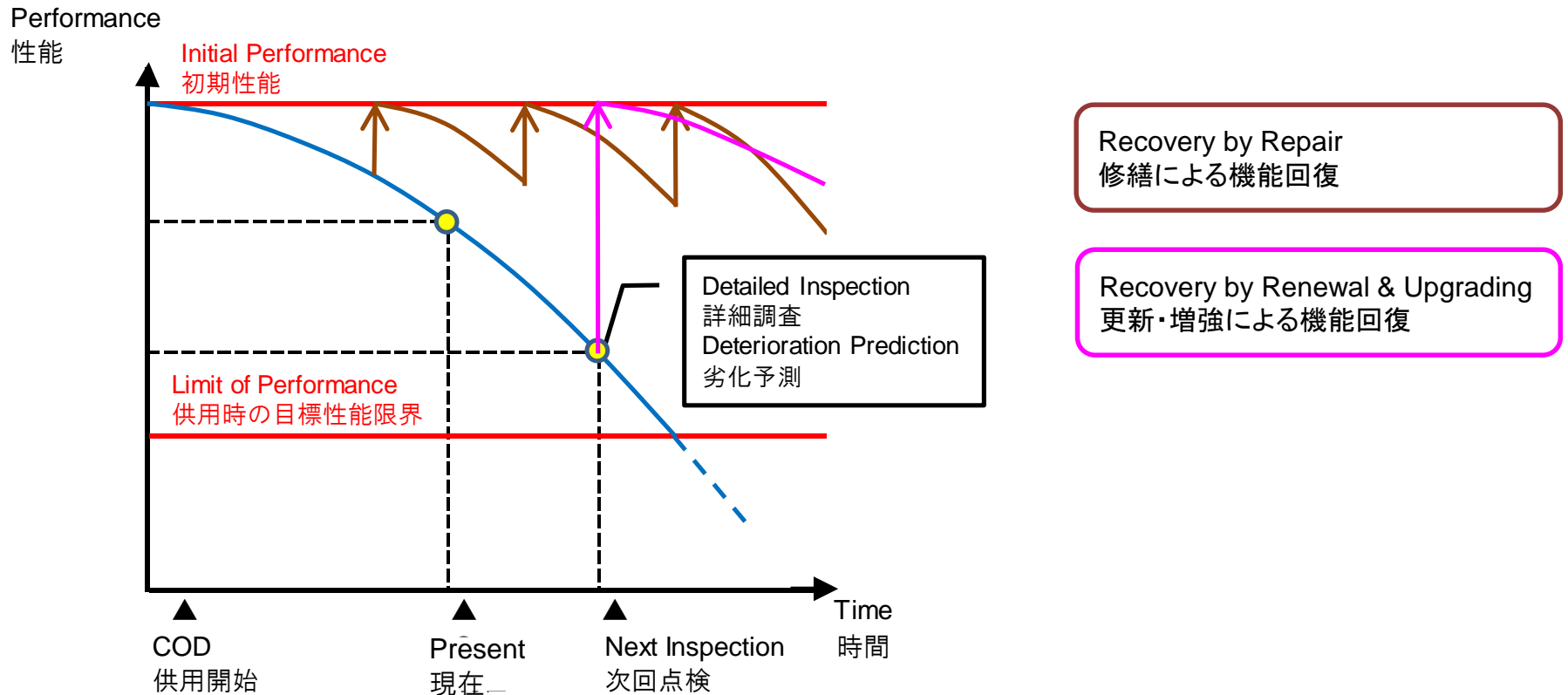
前段階で収集した事例を整理して、意思決定の特徴を分類すると共に、アセットマネジメントで資産価値を向上させるために重要な役割を果たしている目標を抽出。



4. Maintenance Works of Hydro Facilities

水力発電設備の保守業務

(1) Image of Degradation and Recovery 劣化と回復のイメージ



※ ライフサイクルマネジメントによる電力施設の維持管理(第1回):電力土木NO.339 2009.1 を参考に作成



THE INTERNATIONAL ENERGY AGENCY TECHNOLOGY
COLLABORATION PROGRAMME ON HYDROPOWER

IEA Hydropower

(2) Environment surrounding the maintenance work in Japan

日本における保守業務を取り巻く環境

Osaka North Earthquake in Jun. 2018
大阪北部地震 (2018年6月)



Magnitude M6.1
Seismic intensity 6

Transport networks such as railroads and roads
cut in a wide area

鉄道や道路などの交通網が広域で寸断

Typhoon No. 21 in Sep.2018
台風21号 (2018年9月)



Kansai International Airport is out of service
関西国際空港は機能停止

Western Japan heavy rain in Jul.2018
西日本豪雨 (2018年7月)



Evacuation instructions / Recommendations are subject
to a maximum of 8.6 million people

避難指示・勧告の対象は最大860万人超

Hokkaido Iburi Toubu Earthquake in Sep.2018
北海道胆振東部地震 (2018年9月)

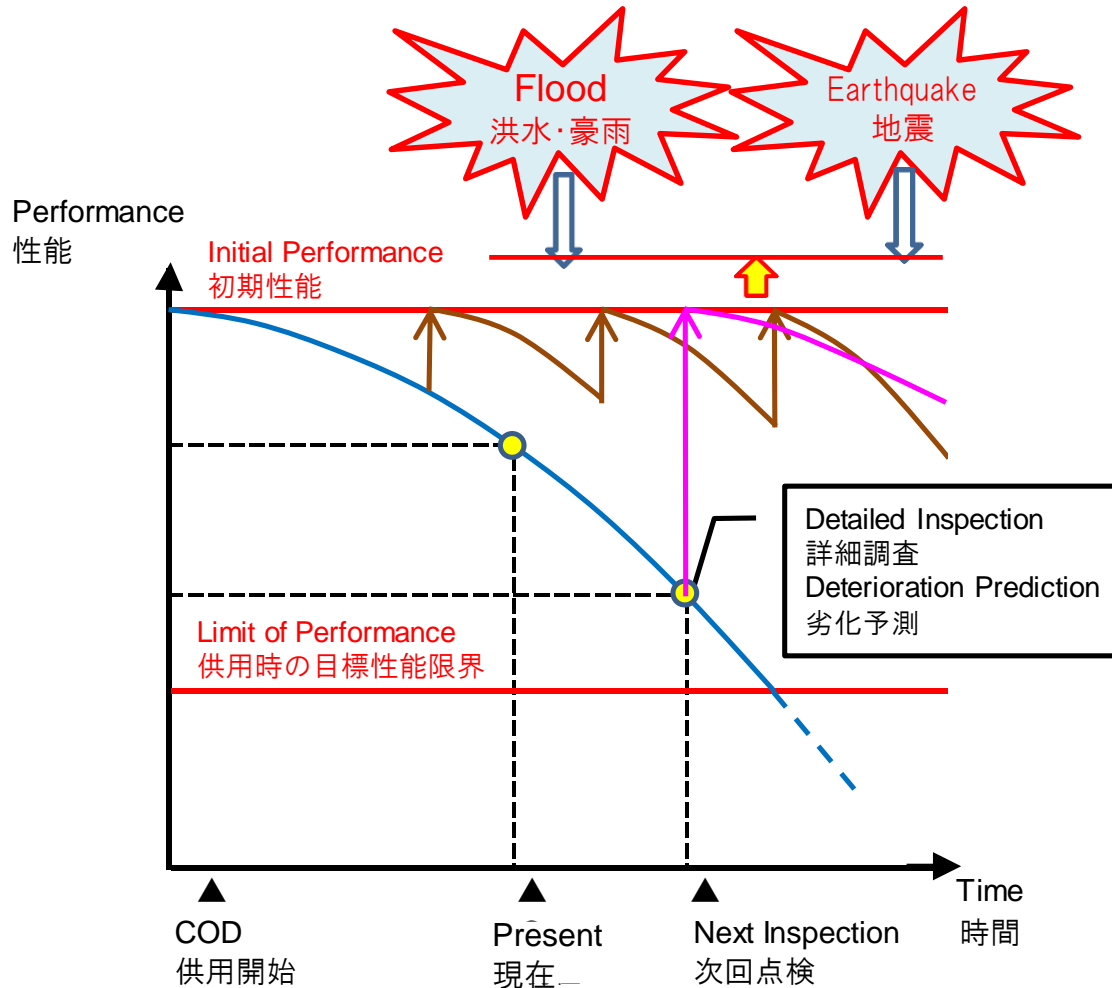


Magnitude M6.7
Seismic intensity 7
Blackout

The number of blackouts is about 2.95 million units
停電戸数は約295万戸



(3) Actual Maintenance Works 実際の保守業務



Disaster Recovery

災害復旧

Disaster risk reduction measures

災害リスク低減対策

Cooperation for flood control

治水協力

Recovery by Repair

修繕による機能回復

Recovery by Renewal & Upgrading

更新・増強による機能回復

Improve efficiency

効率化

Review operation

運用見直し

Effective utilization of water resources

水資源の有効活用

Public Safety

公衆安全

Others

その他

5. Activity Schedule 作業工程

Items / Year		2016			2017			2018			2019			2020			2021		
Annex XV Expart Meeting			● Jul. US	● Oct. CH	● Mar. NW			● Jul. US	● Oct. PO	● Feb. JP									
Workshop/ Seminar			● US	● CH		● ES		● US	● PO	● JP									
IEA Exco		● AU			● NW			● IS		● JP									
1	Proposing of Annex Activity 活動目標の提案																		
2	Materialization of Annex Outline 活動内容の具体化																		
3	Collection of Case Histries 事例収集 ・in Japan ・in US, CA and others																		
4	Data Analysis 資料分析																		
5	Report Completion & Dissemination 最終報告と広報普及																		

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