

Comparison of weather risk assessment methods

Marcel Wiggert, Tamara Brüchmann
 Fraunhofer-Institut für Windenergiesysteme, Bremerhaven, Germany,
 +49 (0) 471 /14 290-303, marcel.wiggert@iwes.fraunhofer.de,
 +49 (0) 471 /14 290-353, tamara.bruechmann@iwes.fraunhofer.de

Summary

In the past years several principle methods for the analysis of weather risks have been developed and applied in the scientific as well as commercial communities. The main concepts are weather window statistic (WWS) and weather time series based approaches. Weather window statistics are cumulative and should be handled with care. However the method is commonly used in the industry, but introduces errors in the estimation of the project duration. Still a proper analysis and comparison of the different approaches has not been conducted. In the presentation both approaches are compared by developing, analysing and discussing different reference cases.

1. Introduction

The main approaches in analysing weather risks are the weather window statistics (WWS) and weather time series based approaches, e.g. the WaTSS – Weather Time Series Scheduling – method.

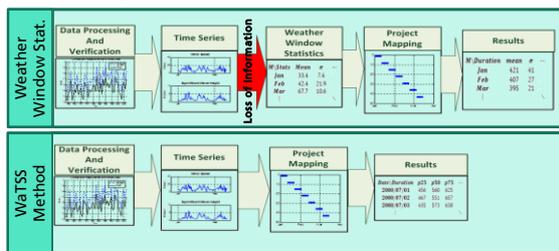


Fig. 1: Schematic concept WWS and WaTSS method

In the frequent application of the WWS the project duration is underestimated by the cumulative nature of the statistics. The underestimation results in project delays and cost overruns. However the effect has not yet been analysed systematically. The error depends on the length/ structure of the activities, season, operational limits, combination of the limits and required weather window length. In the analysis, specific reference project plans have been developed and tested with both methods.

1.1 Weather Window Statistics

Weather window statistics analyse an underlying time series for the specific occurrence of weather windows per month based on defined limiting criteria and required activity duration.

In order to estimate the project duration, each activity is divided by the availability [in percent]. This approach underestimates the project duration, because e.g. an 24h weather window includes also all 4h weather windows or a limitation of $h_s=2,0$ includes all $h_s=1,5m$ weather windows.

1.2 WaTSS Method

On the other hand, in the WaTSS method (Fig 2) all tasks are mapped into the weather time series directly. Therefore, only the available weather window including the sequence are considered.

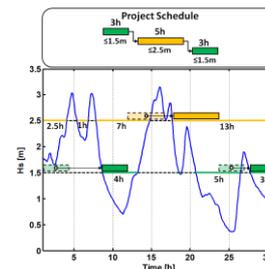


Fig. 2: Schematic concept WWS and WaTSS method

2. Analysis and Comparisons

In the analysis, several project plans have been developed in order to show clearly the described effects. Further three reference case studies/ project plans are analysed to show the relevance in the daily project planning processes.

3. References

- [1] Hristo Lilov, Dr. Marcel Wiggert, Gerrit Wolken-Möhlmann, Dr. Bernhard Lange, 2012 "WEATHER DEPENDENCY OF OFFSHORE OPERATIONS"
- [2] Gerrit Wolken-Möhlmann, Dirk Bendlin, Jan Buschmann, Marcel Wiggert, 2016 "Project schedule assessment with a focus on different input weather data sources"