Validaide

Lane Characterization Case Study

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Case Study: Transport from Amersfoort (NL) to Hanoi (VN)

1. Lane Configuration

The Lane Characterization is applied to a hypothetical transport lane with pick-up in Amersfoort (NL), road transport to AMS airport and arrival at HAN, with a transfer at DOH. The shipment is trucked using VTS and flies with Qatar.

Figure 1: Trade Lane AMS-DOH-HAN

The Lane configuration is defined as follows:

Pick-up	Amersfoort, NL
Origin	AMS
Transfer	DOH
Destination	HAN
Road Carrier	VTS
Air Carrier	Qatar (QR)
Flights	QR 274, Boeing 777 Passenger
	QR 976, Airbus A380 Passenger
Air Carrier Service	Pharmaceuticals (PIL)
Shipping Temperature	+2° to +8°C
Packaging	Passive Insulation

Table 1: Lane Configuration (Input)

Disclaimer: This case study is based on a real flight connection, using a specific road transport provider and ground handling agent at origin, transfer and destination airport. Some parts of the data related to capabilities have been generated randomly. Hence, the risk scores do not provide a real indication of the capabilities of Qatar (QR) or any other Validaide tenant by whatsoever means.

2. Timeplan

For every Lane Characterization a Timeplan is configured, to provide an overview of how the transport process looks in detail. For every step, the process duration is identified and whether the shipment resides within a temperature controlled environment or not. This information is summarized in the Exposure Overview. The example in Figure 1 shows that the shipment is exposed to a temperature-controlled environment for 23:55 hours, whereas it is not temperature-controlled for 02:50 hours.

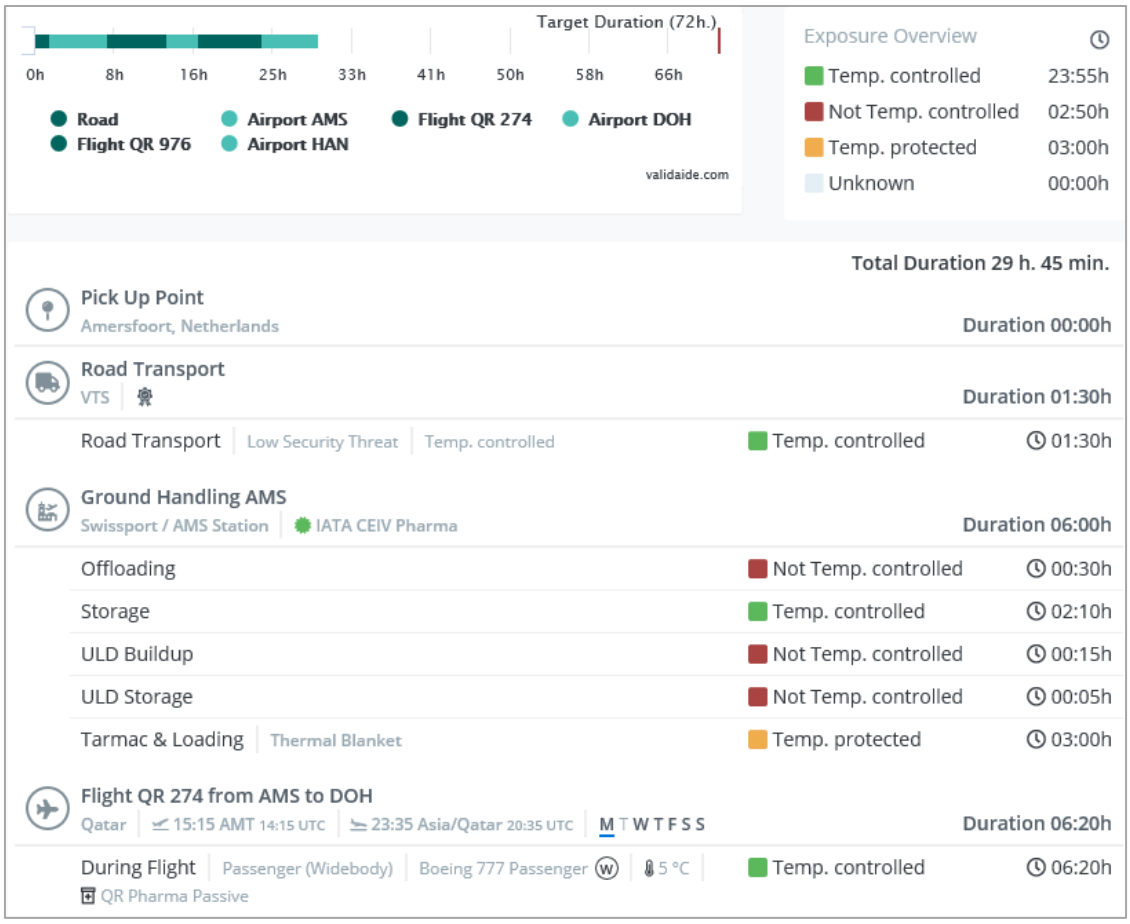

Figure 1: Example Timeplan

3. Predicted Ambient Temperature Graph

The predicted ambient temperature graph depicts the likely ambient temperature that can be expected along the shipping process of a bare pallet. The critical process steps are determined by the shipping Timeplan. The ambient temperature along every process step is on the one hand side determined by the capabilities and the corresponding default temperatures. On the other hand, the profile is complemented with climate data for the different locations (i.e. origin, destination). The global climate data is provided by the WorldClim research project[1], which offers various climate indicators for each

[1] For more details see: *Fick, S.E. and R.J. Hijmans, 2017. Worldclim 2: New 1-km spatial resolution climate surfaces for global land areas. International Journal of Climatology*

18km x 18km section of the globe. The profile is configured for a July and a January extreme, to accommodate for the wide gaps in temperature caused by seasonality.

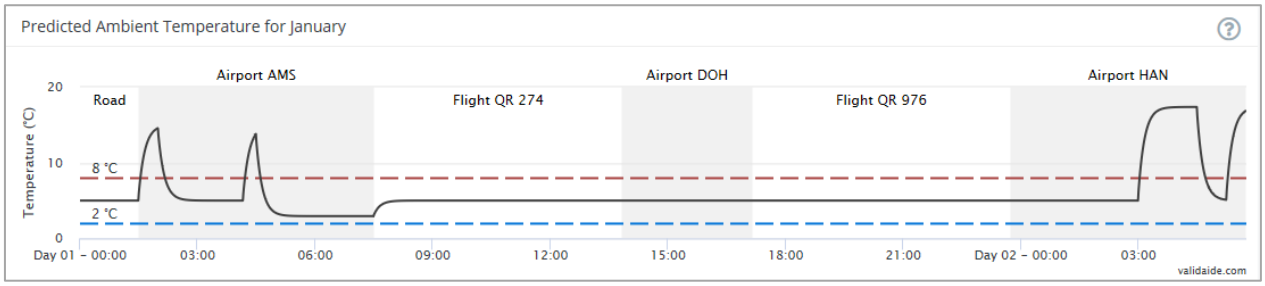

Figure 2: Ambient Temperature Profile - January

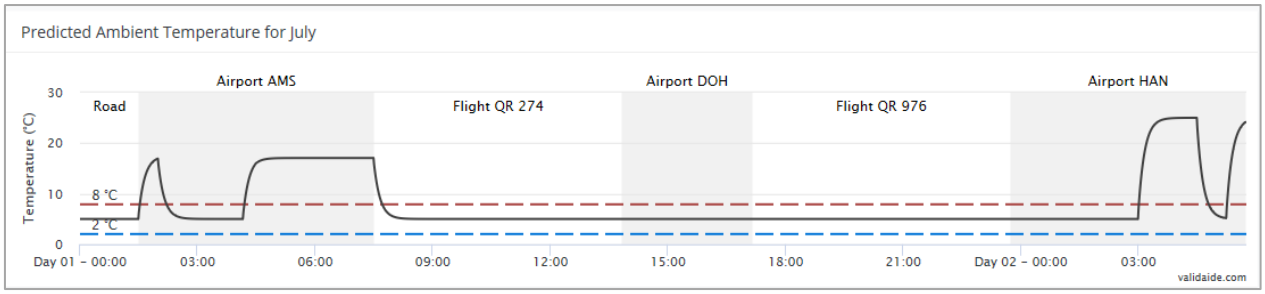

Figure 3: Ambient Temperature Profile – July

Both graphs show that a possible temperature excursion is likely to be experienced on the tarmac in AMS, as well as upon arrival in HAN during ULD breakdown. Hence, the graph provides relevant information for the user who might want to adapt possible risk mitigation measures accordingly.

4. Assessment

For every Lane Characterization, an Assessment is compiled which is summarized by the Pharma Index score and an accompanying graphical evaluation of the Lane. Figure 4 shows that the Pharma Index for this Lane is equal to 3.3, this means that overall the Lane receives a Very Good evaluation. Moreover, the spider graph shows that there are Excellent Security Measures in place along this Lane and that Pharma Quality Management is very much in line with regulations. Also, one can identify that the Temperature Exposure in July is Very High. For all evaluation factors, a classification is identified for every transport step individually as well.

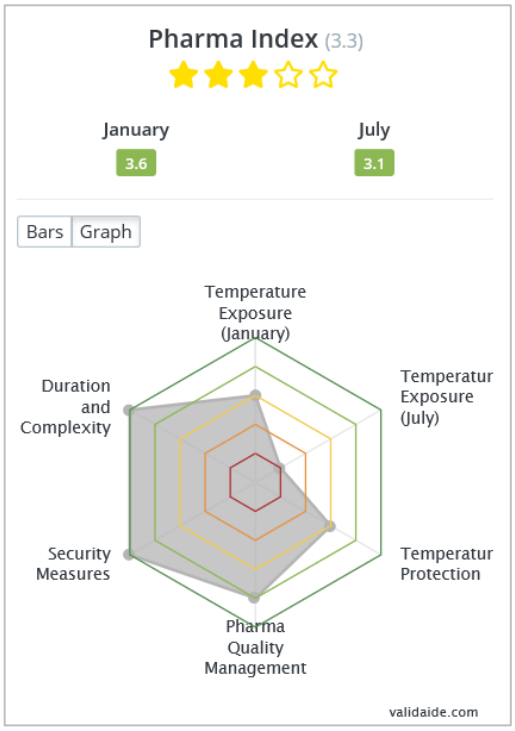

Figure 4: Pharma Index

Temperature Exposure

Based on the predicted ambient temperature profile, Temperature Exposure can be evaluated. The TOR and its classification is identified for every process step, and the weighted average of the classification scores for every step determines the overall Temperature Exposure for a specific leg. The graphs depict TOR as a percentage (%) of the total shipping duration (see Figure 5).

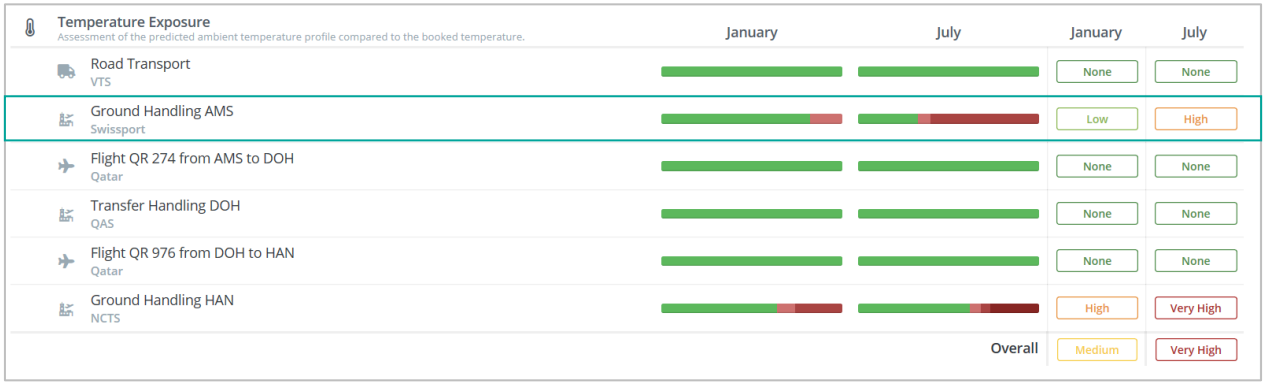

Figure 5: Evaluation Temperature Exposure

On a typical day in July, average temperatures at AMS airport can reach 20°C, which can lead to major excursions. TOR for a major excursion can be >20% of total process step time and therefore Temperature Exposure is High for this process step. On a typical day in January, temperatures at AMS airport are more in line with the shipping temperature and therefore Temperature Exposure classifies as Low. Similarly, Temperature Exposure is evaluated for the other process steps as well.

Temperature Protection

As part of the lane configuration, a user is asked to define the packaging solution type used on that Lane. This information is evaluated in order to provide an indication for the quality of the packaging solution also. The example below (see Figure 6) shows that for this Lane, a passive insulation solution is used, which translates to a classification of Good. In other words, a good level of protection is given by the packaging.

Figure 6: Evaluation Temperature Protection

Pharma Quality Management

Pharma Quality Management provides an assessment of quality management and compliance with pharmaceutical regulations for this Lane. An evaluation is determined for every process step individually (see Figure 7).

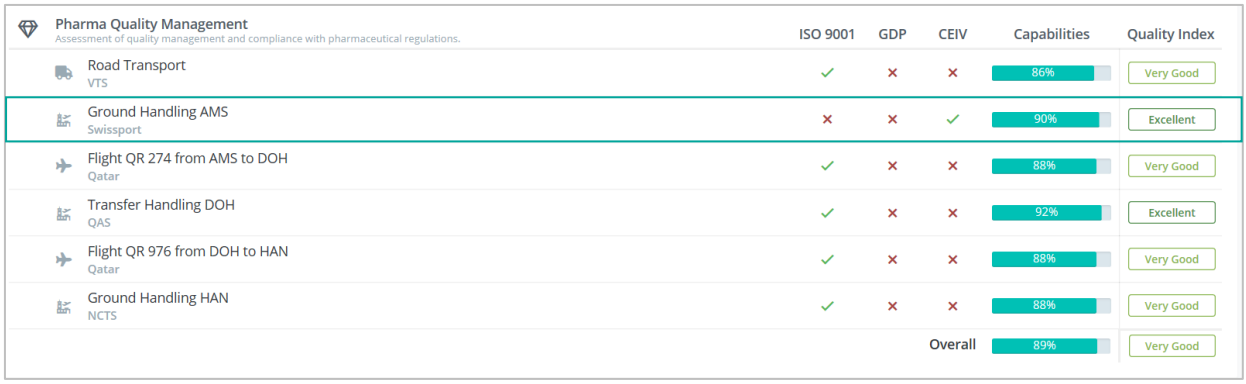

Figure 7: Evaluation Pharma Quality Management

Swissport at AMS airport is CEIV certified, therefore Pharma Quality Management for this process step is initially evaluated Excellent (4.0). The final score is determined by the availability of their core quality capabilities. 98% of the Pharma Quality Management related core capabilities is available, increasing the score to 4.8. Similarly, Pharma Quality Management is evaluated for the other process steps.

Security Measures

Security Measures provides an assessment of the capabilities related to security. An evaluation is provided for every process step individually (see Figure 8).

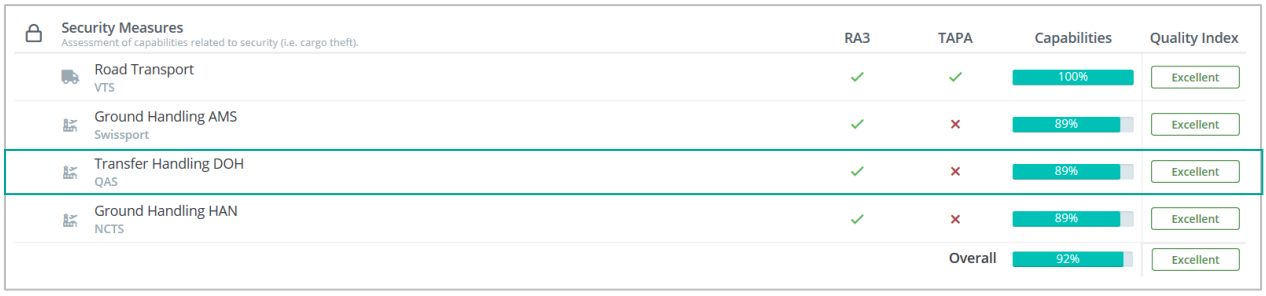

Figure 8: Evaluation Security Measures

QAS at DOH airport is RA3 certified and therefore Security Measures is initially classified as Very High. The final score is determined by the availability of the security core capabilities, standing at 89%. Hence, Security Measures for DOH are evaluated as Excellent (4.6).

Duration and Complexity

Duration and Complexity provides an assessment of total duration and overall complexity of a Lane. The assessment looks at four information elements (see Figure 9):

- Number of legs: applies to a Lane as a whole
- Buffer time: applies to a Lane as a whole
- On-time flight performance: is evaluated per flight individually
- Timeliness Index: applies to the destination country only

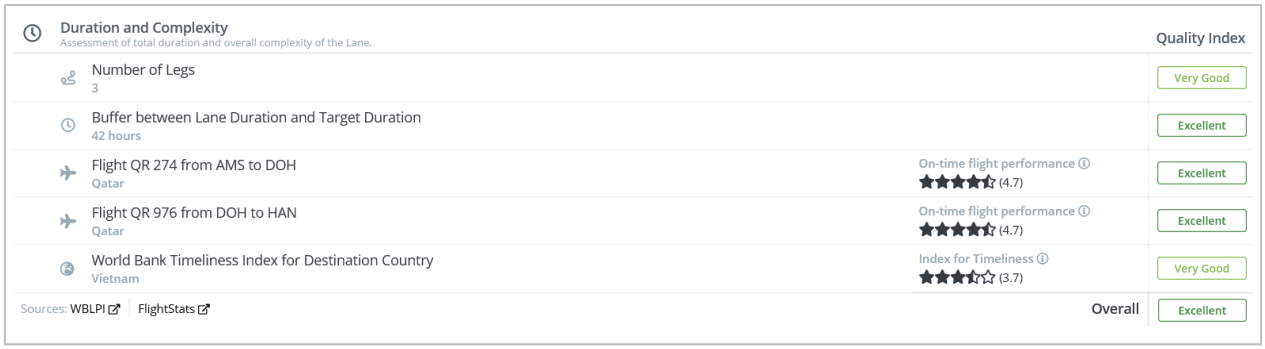

Figure 9: Evaluation Duration and Complexity

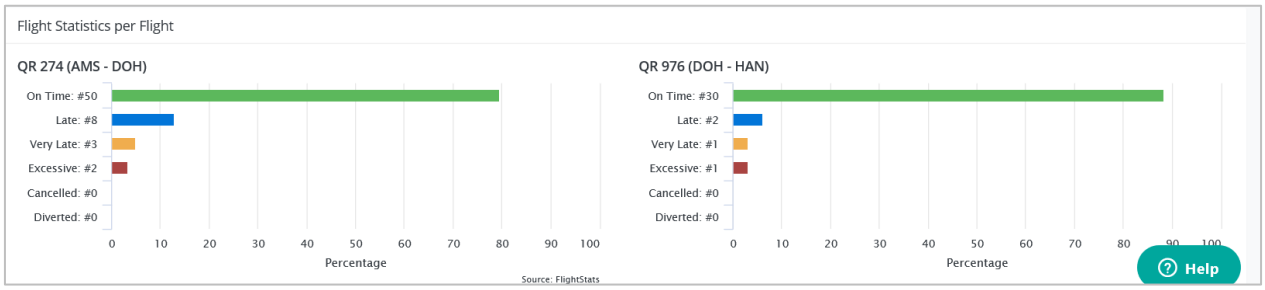

Figure 10: Flight Statistics

This Lane consists of 3 legs, which generally is evaluated as Very Good. Compared to the target duration (72h), a buffer time of 42h is identified for this Lane, this translates to an Excellent evaluation. For flight QR 274 and QR 976, the on-time flight performance rates 4.7 and the Index for Timeliness for Vietnam stands at 3.7. Hence, overall the evaluation for Duration and Complexity scores Excellent.

This is the comprehensive output provided by the Validaide Lane Characterization Algorithm, analysing the quality of a specific transport lane by assessing five different evaluation factors. For Temperature Exposure, the algorithm provides a graphical and a computational analysis. For Pharma Quality Management, Security Measures and Duration & Complexity, the algorithm provides a computational analysis based on input data from the Validaide capabilities platform and other external data sources.

The Lane Characterization provides the user with an informational analysis, which can provide a valuable input for mitigation strategy discussions / decisions. Specifically, the ambient temperature profile / evaluation serves as an informational input for the user to determine where temperature control (e.g. packaging) is needed. Similarly, the evaluation for the other factors informs the user what level of distribution practice can be expected at a specific station or with a specific carrier. Due to a lack of a standardized industry approach for lane assessments, the Validaide approach contributes towards finding such a standard. Hence, the scope of the algorithm is to be refined and improved continuously in the future.