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Learning from incident or,
…how an Occurrence can feed a Risk Assessment

Right of Way infringement
Part Two

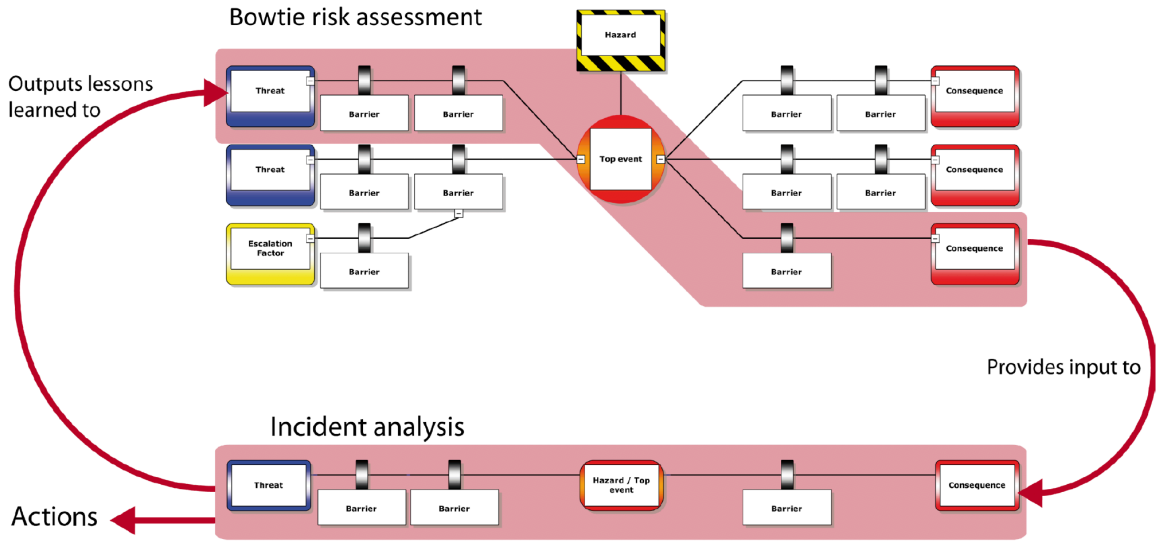
Preface

In Part 1, we built a comprehensive risk assessment to help our airport manager to cope with one of his major scenario, that is the “Right of Way infringement”.
Right of Way is a general term used to describe *"the legal right of a pedestrian, vehicle, or ship to proceed with precedence over others in a particular situation or place".*
In an airport it applies to the policy in force regulating traffic flow, amongst all possible means of transport, in order to ensure safe and expeditious operations. Regulating this subject is of a quite major concern as accident/incident, emerging from collision amongst two or more means of transport, not only have great impact on the safety of operations but, moreover, on the delay associated to such these and last, but not least, on the costs involved in damages (See IATA Ground Damage Database).

In this Part 2 we will show how on occurrence can actually, not only guarantee a useful follow-up to reinforce and improve the risk assessment itself, but also provide input to quantify SPIs.

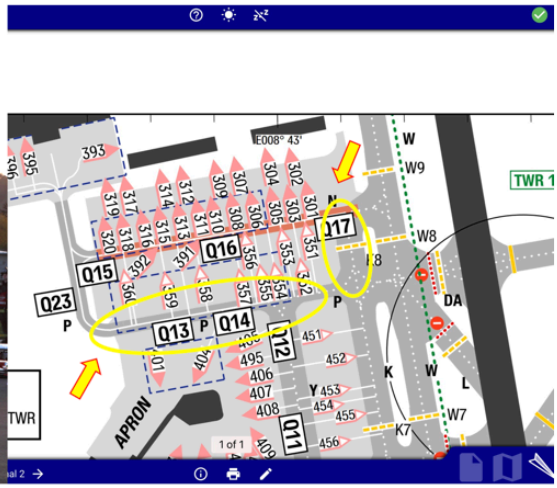
We will perform the analysis of an occurrence using IncidentXP tool by CGE Risk Management Solutions.
IncidentXP combines the most innovative incident analysis methods in one safety tool, allowing you to choose which one you need. Six methods to choose from are most innovative barrier based incident analysis methods, selected for IncidentXP. They are: Timeline, BSCAT™, Tripod Beta (TB), Barrier Failure Analysis (BFA), Root Cause Analysis (RCA), TOP-SET® RCA.

IncidentXP can be used either as a stand-alone module or in strict relation with BowTieXP visual risk assessment.
In this second case, IncidentXP makes sure lessons learnt from incidents are maximized when transferred to the global risk assessment as a follow-up contribution, enhancing safety assurance process.



Ground Safety Report

A GSR is received, elaborated and imported in IncidentXP as below (Figure 1, 2, 3):

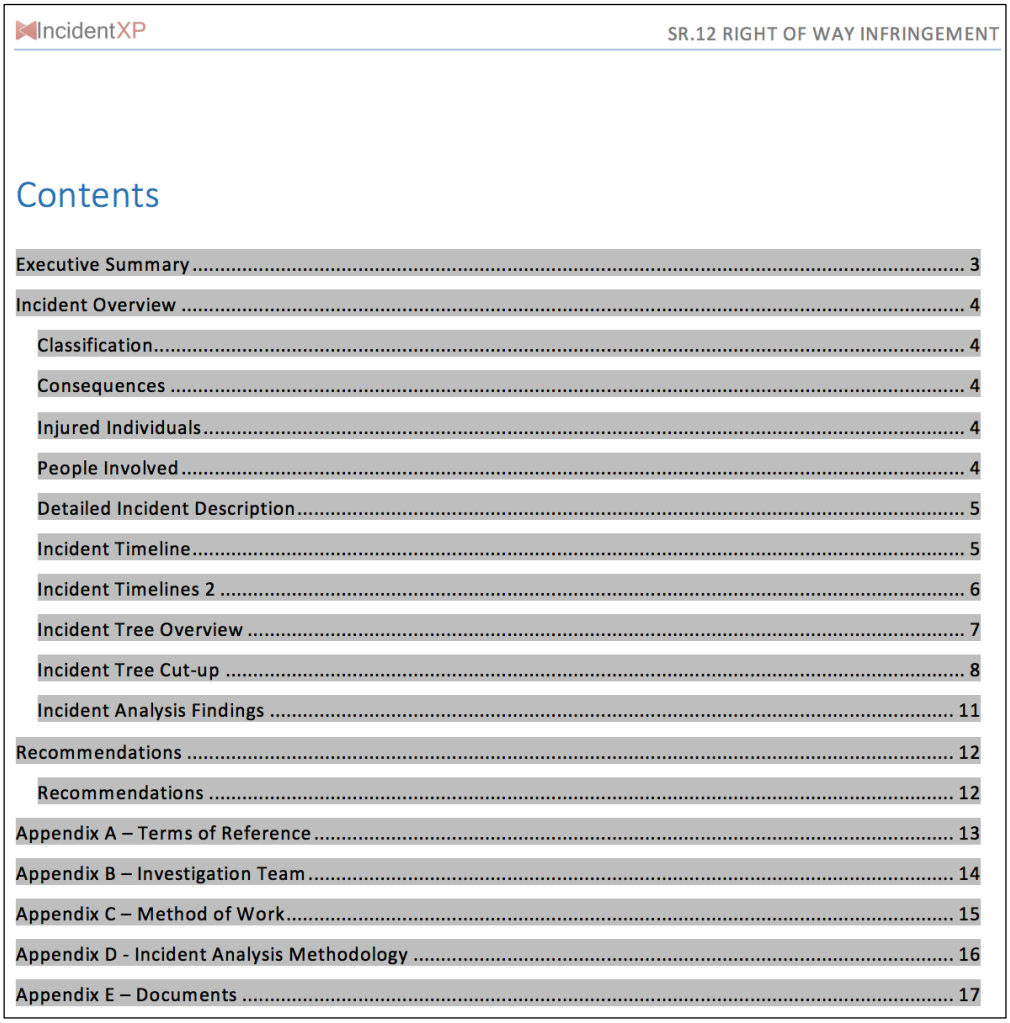


Incident Report

Incident name:	SR.12 RIGHT OF WAY INFRINGEMENT
Incident date:	08/08/18 16:00:00
Incident location:	Aerodrome EEEE
Organizational unit:	Europe
Incident type:	AS Air side
Incident category:	NM Near Miss
Incident tier:	T1 Tier One
What happened:	Evasive manoeuvre of Vehicle XXX with regards to aircraft ZZ-YYY
Plot plan location:	Nil
Geo location:	Nil
Description:	During taxi out for the departure, approaching Q14 on taxiway P, vehicle XXX crossed the taxiway at high speed. The vehicle did not give the way to the a/c ZZ-YYY, without even slow down. Only the aircraft low speed and the pilots' quick reaction avoided the collision. No damages or injuries reported. The crew noticed the vehicle at the end of taxiway P, but unfortunately the near miss collision took place away from the vehicle.
Report version:	SR.12-2018-01
Authors:	Mario Rossi
Report date:	10-Oct-2018

Figure 1: GSR processed in IncidentXP

Figure 2: Place of occurrence



IncidentXP SR.12 RIGHT OF WAY INFRINGEMENT

Contents

Figure 3: Report contents

Occurrence analysis,…or how can a Risk assessment feeds the analysis

The analysis of the occurrence starts with a Time Line Diagram (Figure 4), where all the actors and events can be organized using the time reference line. It is worth noting that this way of proceeding, applies only to occurrences in which it is possible to identify a strict cause-effect relationship between events, that is to say the occurrence can be resolved using "sequential/epidemiological" models of accident analysis. Cases where this is not possible must be managed with other approaches, usually "systemic" ones, where the occurrence is treated as an "emergent" phenomenon rather than a "resolved" one.

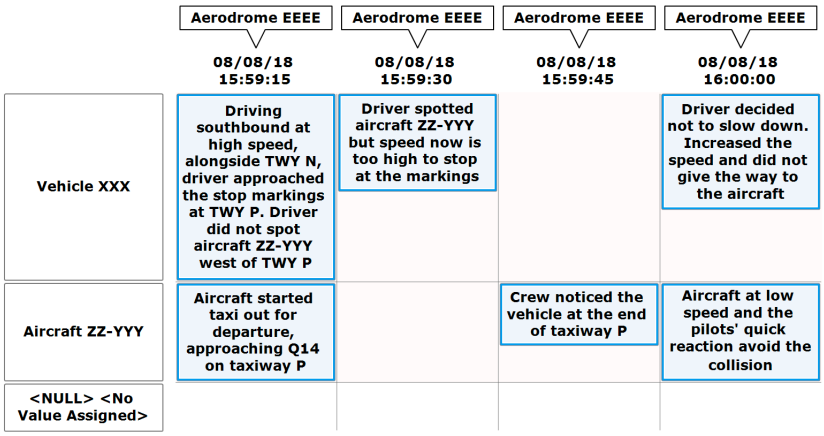


Figure 4: Time Line Diagram

Next step is to draw a BFA Diagram with a deep analysis of the barriers in place (Figure 5).
This is the part where the Risk assessment, developed in Part 1, *feeds the occurrence study,* to analyse which barriers are in place and eventually which of them have failed.

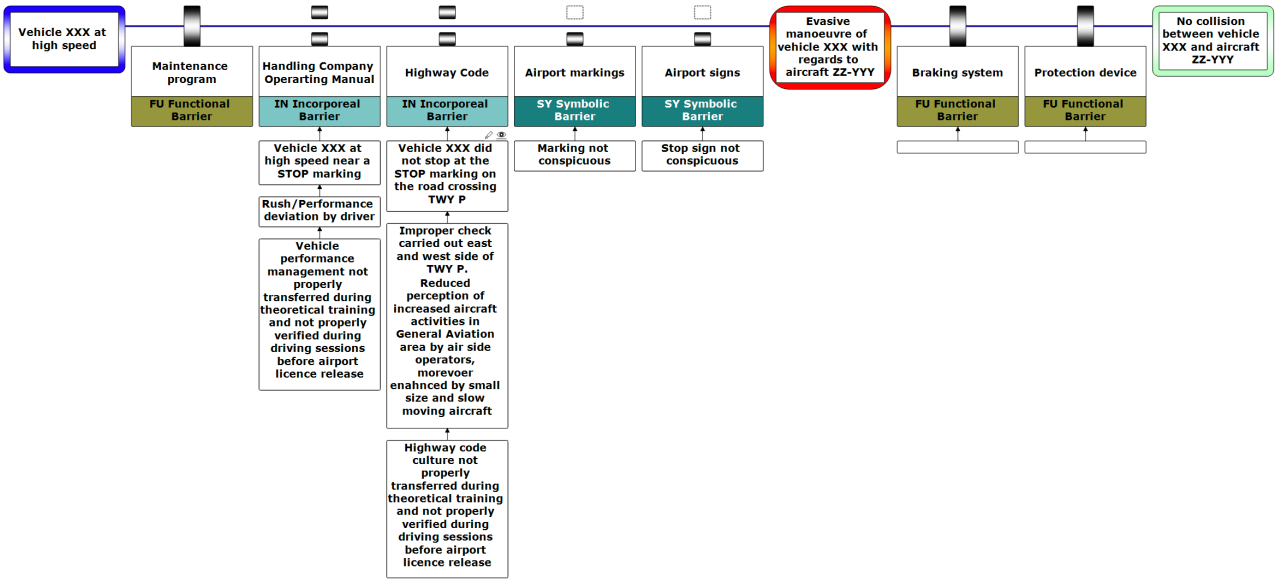


Figure 5: BFA analysis of occurrence

From BFA analysis, 4 recommendations (Figure 6, 7) are produced which have two different impacts. *This is the part where the occurrence analysis feeds the Risk assessment.*

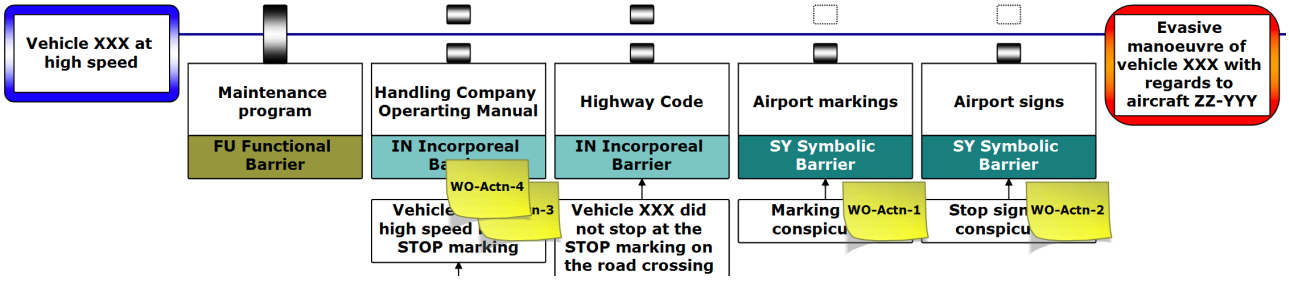


Figure 6: BFA stick-notes for actions in place

Code	*Name*	*Action party*	*Target*
WO-Actn-3	Safety recommandation During next SRB, SMS will propose a specific focus on Right of Way infringement and over the next days a Safety recommendation will be issued to all Air Side personnel to raise safety awareness on the subject. Moreover, a dedicated Safety Yellow Car could be introduced as a new symbolic barrier in critical areas of the airport	Airport Handling Company	31/10/18
WO-Actn-4	Safety recommandation During training and on the job session for airport driving licence issue, Handling Agents shall exercise extreme care on how drivers will comply with highway code, in particular with stop markings and right of way procedures. Airport Handling Company will be programming ad hoc audits to verifiy implementation of such recommendation	Airport Handling Agent	31/10/18
WO-Actn-1	Warning markings More conspicuous ground markings would enhance drivers perception when crossing congested TWYs	Airport Authorities	30/11/18
WO-Actn-2	Warning signs Bigger and alternate-lit signs would enhance drivers perception when crossing congested TWYs	Airport Authorities	30/11/18

Figure 7: Recommendations after analysis

1. Strengthening of 3 existing barriers “Handling Company Operational Manual”, “Airport markings” and “Airport signs” with Actions 1 to 4;

2. Introducing a new barrier, “Safety Yellow Car”, in the native risk assessment, with Action 4 (Figure 8);

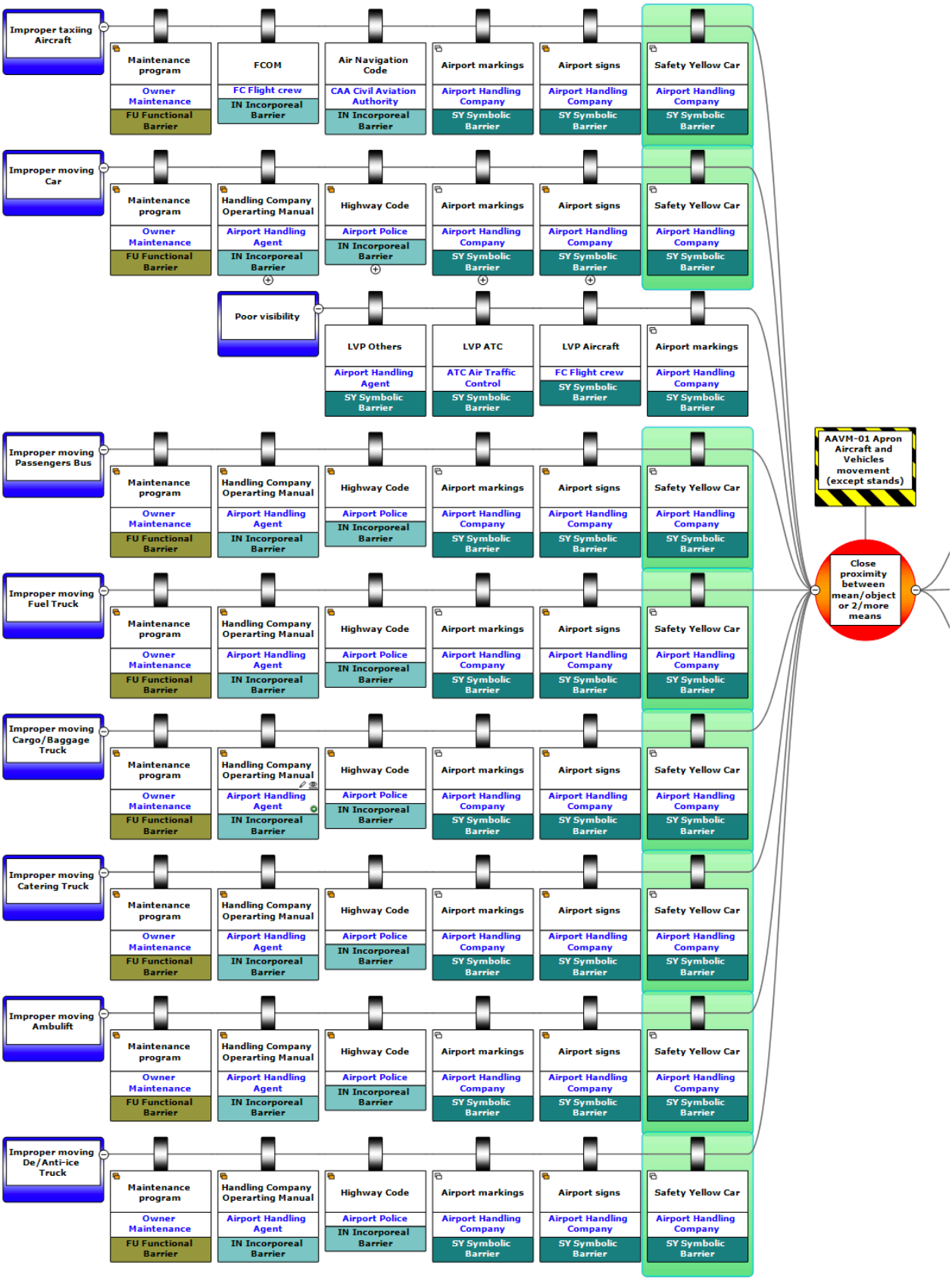


Figure 8: Modified Risk assessment following BFA recommendations

Finding useful numbers, …or quantifying SPIs and Risk

A useful functionality of BowTieXP is reading a developed risk analysis through "IncidentXP eyes".
If all occurrences belongings to the same hazards are examined in relations to the same native risk assessment (Figure 11), counters for threats/barriers/hazards/consequences are automatically generated and displayed when IncidentXP Filter is applied ON. This approach is of an incredible help when trying to quantify risk and SPIs (Figure 9, 10).

Imagine you have collected all the occurrences of one month belongings to the category of our Top event "Close proximity between mean/object or 2/more means".
Let's concentrate only, for the sake of simplicity, to those occurrences belongings to the Threat "Improper moving Fuel Truck" (same considerations can be done for other threats).
Applying IncidentXP Filter, we can count how many times a Top event (numbers of Occurrences collected, T) and Consequence took place (C usually less than T).
Looking at the barriers we'll have displayed failure information, including their behaviour associated to the related threat line (B_1, B_2, B_3, B_4, B_5): these numbers are strict relatives to SPIs.
If we manage, somehow, to get the total numbers of movements of our fuel trucks (M), for instance getting the total numbers of invoices produced by all fuel providers in my month window (each invoice implies a truck movement) we can finally generate B_i/M (i from 1 to 5), T/M, C/M ratios that can be used to generate SPIs/Top event/Risk frequency.
Moreover, having always care of linking occurrences to risk analysis, where possible, trends can be refined even more.

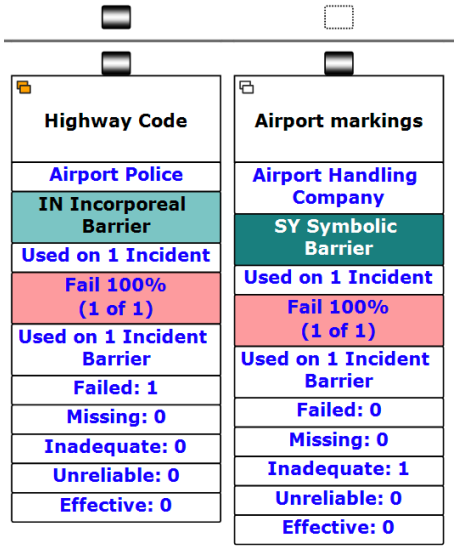


Figure 9: Barriers Counters

Finally, those ratios are realistic indicators to be used when barriers of same kind are placed in a different risk analysis context during a prospective approach, where usually probabilities are not so clear a priori.

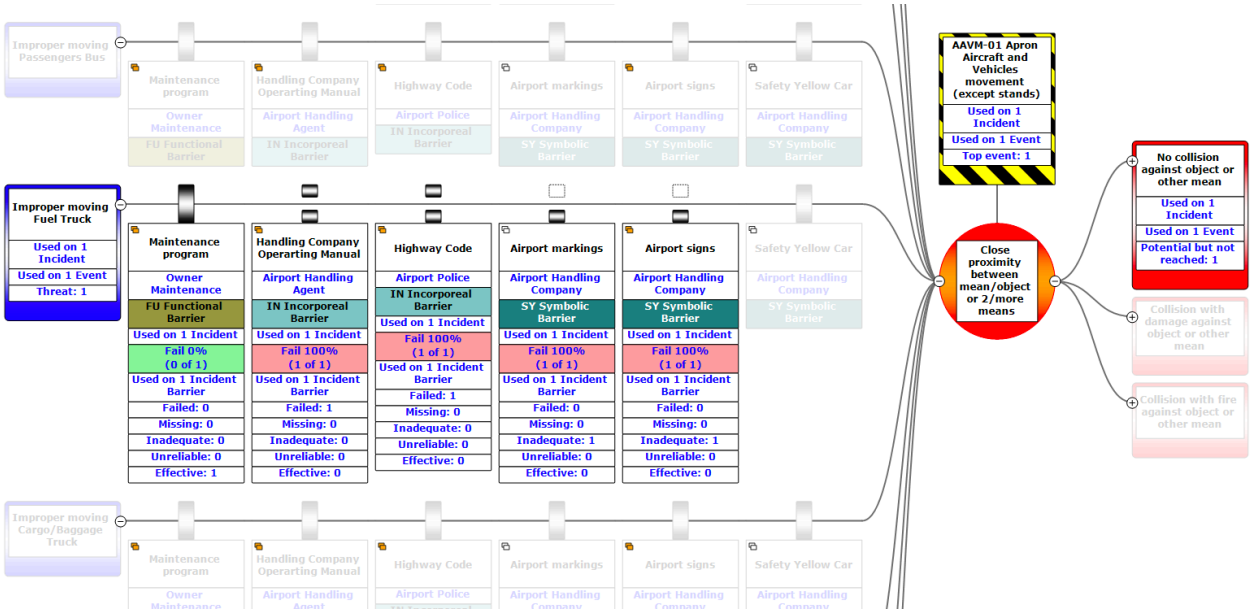


Figure 10: BowTieXP risk analysis with Incident Filter ON

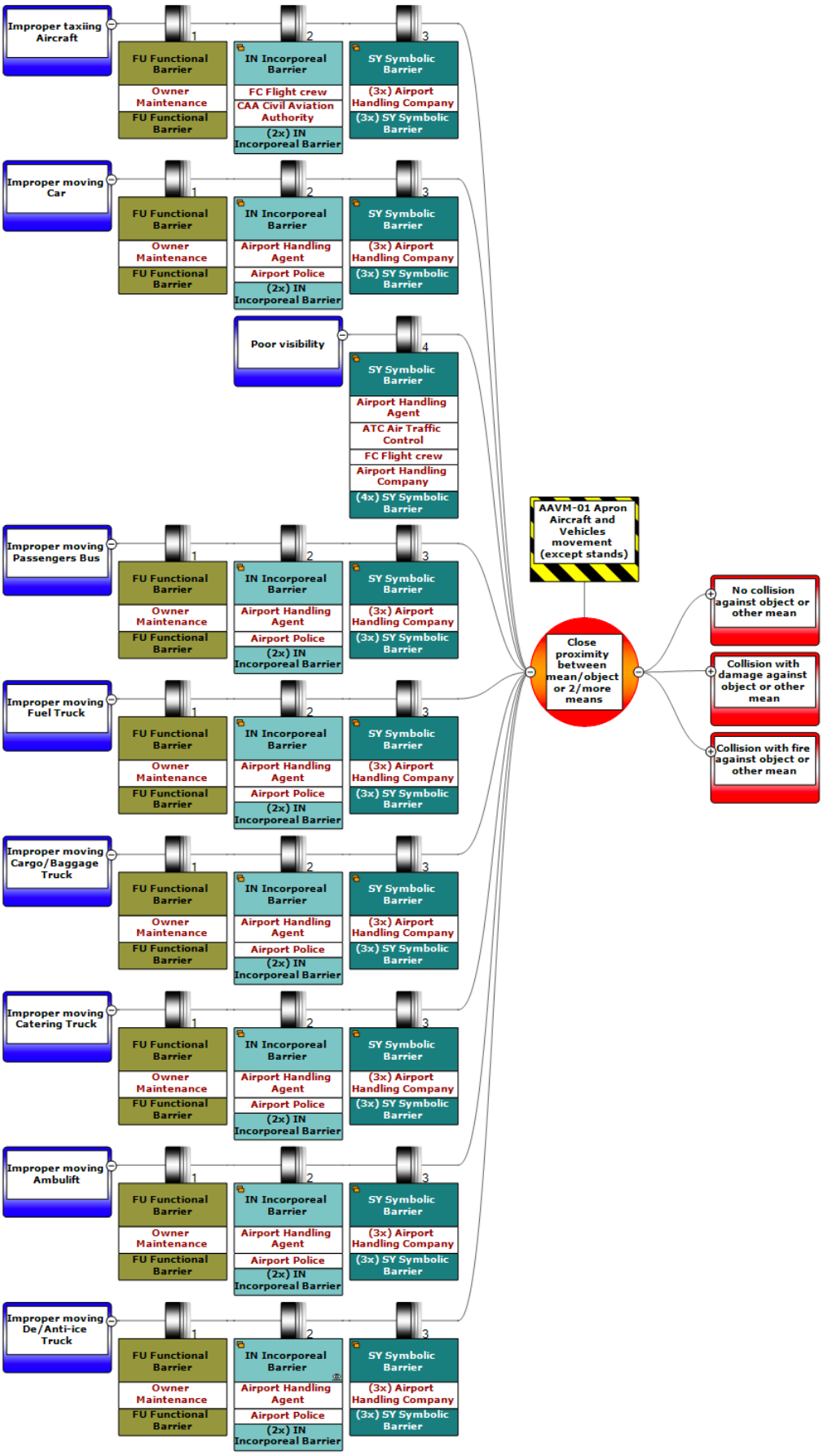


Figure 11: Native Risk assessment with Barrier Grouping ON