

# Analysis of ten years data and countermeasures to reduce significant bird strikes on the large glass walls of a museum building by lighting design



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Fig. 1 Kyushu National Museum with glass walls reflecting woods

## Introduction

Usage of glass walls is a popular building design in recent museums. However bird strikes on the glass are observed in some cases. We report on our effort to reduce such strikes at Kyushu National Museum, which has large glass walls that reflect the scenery of surrounding woods.

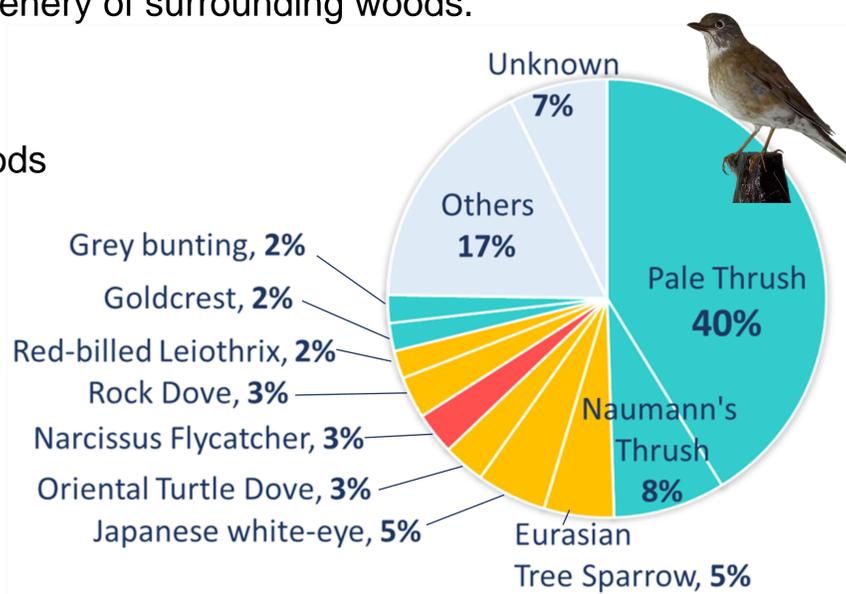


Fig.2 Bird species that struck during 2004 to 2015.

Green: Winter migratory birds.  
Orange: Resident birds.  
Red: Summer migratory birds.  
Pale blue: others /unknown

## Analysis

From the analysis of the data from 2004 to 2015, frequent strikes had occurred:

- On the north wall of the museum.
- In winter. Approximately 50% were winter migratory birds.
- In mornings and around dusks (data not shown)

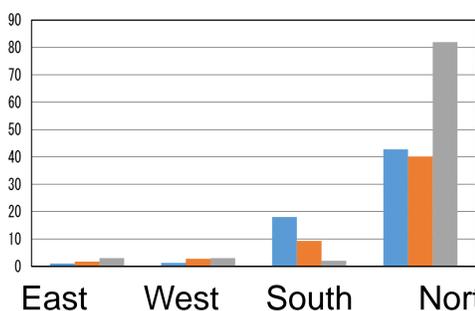


Fig.3 Annual average bird strikes by directions of the building.

Blue: 2004-2007. Orange: 2008-2014. Gray: 2015.

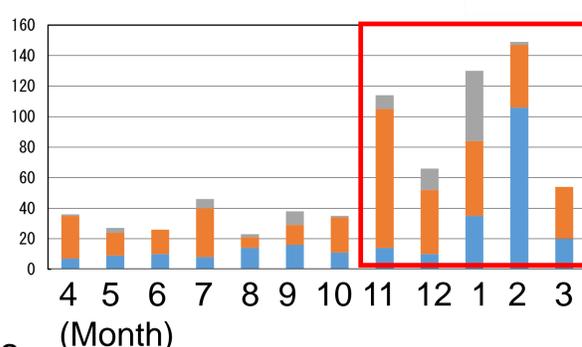


Fig.4 Monthly average of bird strikes. Blue: 2004-2007. Orange: 2008-2014. Gray: 2015.

## Countermeasure & results

In order to let birds know that the glass walls exist, preliminarily we tested lighting on the wall from dusk to morning (16:00 to 9:00) in November 2016. As we observed the drops of strike numbers of winter birds, we determined to turn on the blue LED lights.

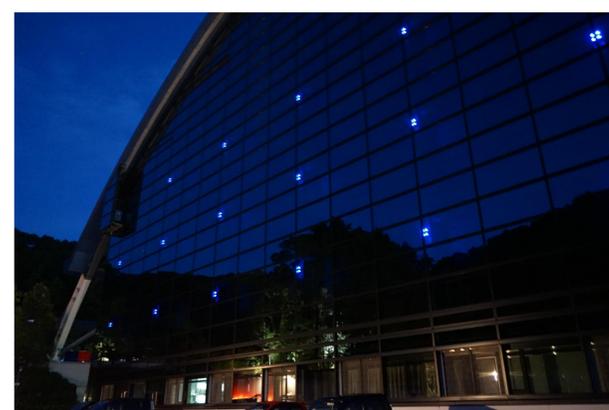
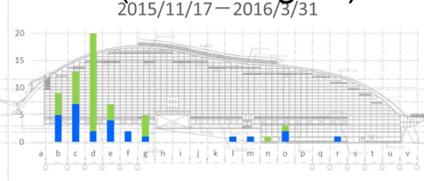
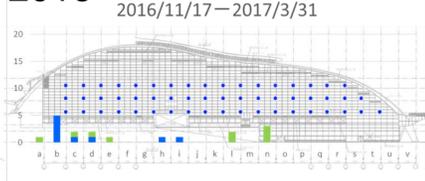


Fig.5 Blue LED lights lit from 16:00 to 9:00.

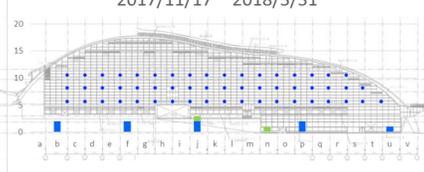
### 2015 (without lights)



### 2016



### 2017



### 2018

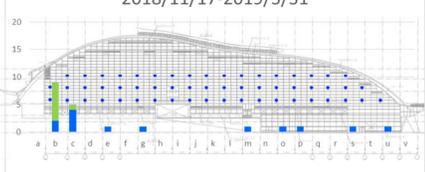


Fig.6 Bird strikes on the north wall

Blue columns: Reported from 16 to 9 o'clock (LED lights on).  
Green columns: Reported in the daytime (LED lights off).

From the observation for four years, the number of bird strikes in winter decreased significantly in 2016 (after starting lighting in winter) compared with the previous year 2015 (before starting lighting). Although there seems to be a slight setback in 2018, still the numbers are less than before starting lighting. We continue to observe and may add other control measures.

The electricity of the whole lighting costs about 60 yen (less than 0.5 EUR) per day, and it is a cost effective measure.

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