

# Quality of Protection Modeling Language: Models

ROLLER COASTER STRUCTURAL  
HEALTH MONITORING WSN

January 19, 2015

QOP-ML



**Contents**

**QoP-ML Model: Roller Coaster Structural Health Monitoring**

- WSN** **3**
- 1.1 General Information . . . . . 3
- 1.2 Model Description . . . . . 3

# QoP-ML Model: Roller Coaster Structural Health Monitoring WSN

## 1.1 General Information

<b>Model Name:</b>	Roller Coaster Structural Health Monitoring WSN
<b>Authors:</b>	Damian Rusinek, Bogdan Ksiezopolski
<b>Authors' E-mail Addresses:</b>	damian.rusinek@gmail.com bogdan.ksiezopolski@acm.org
<b>Requires:</b>	AQoPA 0.8.4
<b>Analysed In:</b>	
<b>Date:</b>	2015

## 1.2 Model Description

The model presents wireless sensor network deployed on roller coaster for structural health monitoring. The aim of network is to collect acoustic data which

is later analyzed for cracks.

Its main aim is to collect acoustic emission data during the ride which is transmitted to the gateway and analyzed for cracks. This method is still widely used as inspection method. Using wireless sensor network gives a possibility to react to detected failures in real time. In the case study we have used the Rougarou roller coaster from Cedar Point theme park. It is interesting example because the roller coaster was opened in 1996 and named Mantis while now it is being rebuilt to be a floorless coaster. Therefore the main structure remains and is going to be operated by new coaster. The Rougarou is about 1200 meters length, 44 meters high and the speed goes up to 97 kmph. We place sensing nodes every 3 meters on the track while the sink is mounted to the car and collects data from sensors during ride.