The Reduction of Traffic Congestion by Using Big Data in NEXCO-Central

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A major P3 player in Japan with over 60-year experience at every stage of expressway construction, maintenance, inspection & repair and rest area management

- Around 10,000 employees*
- 1,283 centerline miles in Operation*
- 1.91 million vehicles per day**
- US$ 6.27 billion of toll revenues**
- US$ 1.75 billion net sales from 180 rest areas**
- Headquarters: Nagoya, Japan

*Data as of August, 2016
**Data as FY2015
Operation and Management (O&M) solutions for keeping expressways in good condition

**Toll Collection**
- ETC Services (almost 100% accuracy)
- Remote Toll Facility Monitoring

**Traffic Control**
- Traffic Control Center
- Traffic Squads
- Checking overloaded truck

**Engineering**
- Inspection & Diagnosis and Engineering work

**Maintenance**
- Repair | Cleaning | Landscaping
- Pavement maintenance
- Lane Closure for maintenance works

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Background

- Our jurisdiction includes the Greater Tokyo Area (population: 30 mil.+), and Chukyo Metropolitan Area (population: 9 mil.+), centered around Nagoya.
- Managed and operated traffic-congestion-prone expressways for decades.
- Accumulated knowledge and expertise through continuous challenges for congestion mitigation in high population density areas where available land is limited.
Presentation Objective

**Objective**: Traffic Demand Reduction

**Proactive Approach**
- Congestion Forecast
- Giveaway Campaign
- Road Pricing
- Intensive Maintenance Operations

**Reactive Approach**
- Variable Message Signs
- Rest Area Traffic Information Kiosk
- Exclusive Advisory Radio
- Website, Telephone Service
Basic Idea

- Congestion Forecast -

✔ Encourage drivers to change their choices of departure time and route to distribute the traffic demands from peak hours to non-peak hours.
Data Collection Tools

- CCTV Camera
- Traffic Squads
- Meteorological Observatory
- Image Processing Traffic Counter
- Data Base
- ETC
- ITS Spot (ETC2.0) - Probe Data -
- Road Users Mobile Phone
Data Analysis & Prediction

- Congestion Forecast -

Traffic Congestion Data

3 years ago

2 years ago

1 year ago

- Congestion Prediction Day

- Time

- Length

✓ Predict congestion based on the past congestion data collected

✓ Eliminate the effect of incidents and abnormal weather stored into the database

✓ Take into account the effect of total traffic demand, network/lane expansion, public events, holiday, day of the week, and so on
Customers can easily obtain expected traffic congestion and travel time by simply inputting their travel plans to the NEXCO-Central search engine.

They can choose the best travel timing to avoid heavy traffic while we enjoy traffic flow alleviation.
Congestion Forecast Dissemination

Distribute the congestion forecast guidebook at rest areas, customer service offices and our website at the time when the severe congestion is predicted such as holiday seasons.

Guidebook w/ Predicted Traffic Congestion

Daily Traffic Congestion Forecast in Holiday Season

*Red indicates severe congestion predicted

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Giveaway Campaign and Result

- To enhance the traffic demand distribution, the Giveaway Campaign is combined with the congestion forecast.
- The giveaway campaigns are conducted in accordance with severe congestion forecast.
- The applicant who registered for the program in advance and drove in the designated off-peak time can get a discount ticket for our rest areas.

### Traffic Volume During Peak Time (vehicle/hour)
- 2013: 1,424
- 2014: 1,145

### Traffic Congestion Volume (km*hour)
- 2013: 171
- 2014: 110

20% Down

36% Down
Conclusion

- Congestion forecast contributes to the reduction of traffic congestion by distributing the traffic demand on peak time into off-peak time
- NEXCO-Central's congestion prediction uses and analyzes a vast range of data based on the results from the past 3 years
- Incentive programs such as giveaway campaign accelerate the traffic distribution and reduce congestion
- We have accumulated data and the knowledge on traffic congestion mitigation, and teams up with IT company taking advantage of predictive analysis & big data
- Visit our booth for more details!