MANAGEMENT OF Oversized/Overweight Vehicle Operations Using Information Technology

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1. The current status of oversize/overweight vehicle operations in Japan
2. Outline of the oversize/overweight vehicle monitoring system
3. Impact of the system operation
The regulation of vehicle operation stipulates the limits of vehicle features

- Regulating under the terms of the limits of scales and magnitudes (Vehicle regulations)

**Example of stipulated limits**
- **Tonnage**: a single unit (vehicle other than trailer)
  - 25t (expressway and specified road)
  - 20t (road other than abovementioned)
- **Trailer**:
  - 36t (expressway)
  - 27t (other than expressway)
- **Axle load** (load on a single axle)
  - 10t
- **Vehicle height**: 3.8m
- **Vehicle width**: 2.5m
- **Vehicle length**: 12m

1. The current status of oversize/overweight vehicle operations in Japan

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- Tonnage: 25t (expressway and specified road), 20t (road other than expressway)
- Trailer: 36t (expressway), 27t (other than expressway)
1. The current status of oversize/overweight vehicle operations in Japan

Oversize/overweight vehicle operation permission system

- A vehicle that exceeds the scale and weight restrictions is allowed to operate only if it is structurally particular or is loaded with particular freight permitted under terms of agreed operational conditions along specific routes by the authority.

Examples of oversized/overweight vehicle

Track crane

Heavy semi-trailer
1. The current status of oversize/overweight vehicle operations in Japan

Operation status of oversize/overweight vehicles

- Currently, the operational ratio of oversize/overweight vehicles which potentially exceed regulated limits accounts for less than 1% of all vehicles
- About 70% of the 20t vehicles in operation are in violation

### Number of Vehicles

- **Vehicle ownership**: About 70 million cars
  - **Passenger car**: About 50 million cars
  - **Commercial car**: About 20 million cars
  - **Vehicle with total weight of 20t or less**: 19.7 million vehicles
  - **Vehicle with total weight of more than 20t**: about 300,000 vehicles (0.4%)

### Actual condition of driving vehicles with total weight of more than 20t

- **Total annual driving times**: about 38 million times
  - **Permitted**: About 18 million cases
  - **Violation in conditions**: About 8 million cases
  - **Legal**: About 10 million cases
  - **Violation in driving**: About 28 million cases
1. The current status of oversize/overweight vehicle operations in Japan

Impact of vehicle in violation on road

- Impact on road structure
  - Pavement  approx. 30%
  - Concrete slab (bridge)  approx. 60%

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1. The current status of oversize/overweight vehicle operations in Japan

Current enforcement

- Regular enforcements on oversize/overweight vehicles conducted at specified locations face the limit in terms of location and manpower
  - Enforcement frequency
    | Ministerial jurisdiction road | one-time enforcement duration is approx. 2 hours per month |
    | Expressway                    | 7 patrolling service vehicle groups conduct a four-hour enforcement everyday throughout the country |

- Less than 1% of vehicles in violation are subject to enforcements

More powerful monitoring system for enforcement is required
2. Outline of the oversize/overweight vehicle monitoring system

Oversize/overweight vehicle monitoring system

- System components
  - Roadside unit ... Measure operational vehicle characteristics
  - Central processing system ... Process the data obtained by roadside unit

Roadside unit relays to Central system
2. Outline of the oversize/overweight vehicle monitoring system

**Capacity of roadside unit**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Weighing</td>
<td>gather vehicle characteristic data (of all vehicles)</td>
</tr>
<tr>
<td>□ Scaling</td>
<td>compile a set of data for a single vehicle and relay to a central system</td>
</tr>
<tr>
<td>□ Gathering the vehicle data</td>
<td>gather specific data (vehicle regulations: vehicle data exceeding regulation limits is subject to gather)</td>
</tr>
<tr>
<td>□ Processing</td>
<td></td>
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</tbody>
</table>

**Capacity of a central processing system**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Identifying vehicle in violation</td>
<td>non-permission, violating operation</td>
</tr>
<tr>
<td>□ Storing data on vehicle in violation</td>
<td>Store the data of vehicles in non-permission and violation</td>
</tr>
<tr>
<td>□ Creating black lists</td>
<td>Create the lists of vehicles in non-permission and violation</td>
</tr>
</tbody>
</table>
2. Outline of the oversize/overweight vehicle monitoring system

Data flow

1. Measured features of vehicle in operation
   - Total tonnage, Vehicle type, Number of axles...

   Classification of oversize/overweight vehicle

2. Identifying the Oversize/overweight vehicle
   Acquisition of the data on objective vehicles

   Collates with permitted Conditions
   Applied
   Discrepancy in application
   Conforms to application

   Not applied
   Not permitted
   Violations
   Non violation

Issuance of a list of violator

Gives enforcement directions to trucking operators based on the black lists.
3. Impact of the system operation

Impact of the system operation

- Annual maintenance & repair cost approx. 570 billion yen
  (About 210 billion yen out of both totals is ascribed to vehicles in violation)
- In the case of a 20% reduction in the number of vehicles in violation.

Impact on Pavement

- 20% reduction
  - Illegal vehicles: 29%
  - Law-abiding vehicles: 71%
  - Total: 97%

Impact on concrete slab (bridge)

- 20% reduction
  - Illegal vehicles: 47%
  - Law-abiding vehicles: 44%
  - Total: 90%

Estimation revealed that about 5% (27 billion yen) of the annual cost can be reduced
The plan are for the proved system from this study to be extended throughout the country from this fiscal year forward when and where appropriate.