Study on the Development of Multipurpose Snow Removal Vehicles

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0. CONTENT

1. Introduction

- Disasters related with road accidents are continuously increasing
- In particular, unexpected heavy snow is to paralyze the function of the city
- It is necessary to make prompt snow removal work
- In this study, we conducted a research to develop all season multi-purpose vehicles
- Also, we derived concept design and required functions for a multi-purpose snow removal vehicle

<Paralyzed transportation function by heavy snow>

2. Purpose of Study

- There could be the following hazardous environment in winter

  - Frozen roads at night will cause traffic accident

  - Snows not yet cleared up interferes with smooth traffic flow

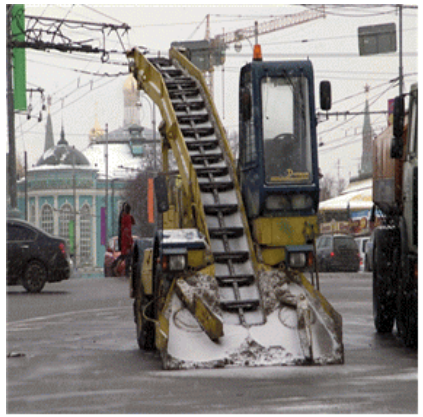
- Therefore, the purpose of this study is to develop a multi-purpose snow removal vehicle which has the following features

  - The remaining snow is being directly melted by vehicle

  - The vehicle performs common road maintenance work in off-winter seasons

3. International and Domestic Technology Trends

- Their equipments are all used to immediately melt snow collected mainly from airports.(USA et al.)



- In Korea, a snow melter was developed for the second time in the world

4. Analysis of Road Maintenance Processes for the development of Year Round Usable Multi-Purpose Vehicles

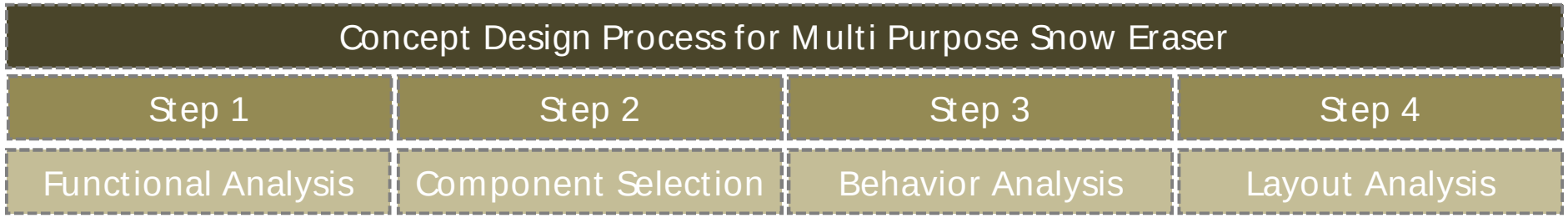
- We analyzed annual road maintenance processes including snow removal work carried out in one of road maintenance organizations of Korea

Common road maintenance work		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
road maintenance in winter	snow removal												
	snow removal work preparation												
	snow removal material obtained												
Roads/facilities cleaning													
Weeding													
Drainage cleaning													
Flood preparation													
Pavement repair													
Patrol, safety facilities inspection, fallen objects collection garbage collection, etc.		Performed yearly at any time											

- In conclusion, there exist differences by region, road characteristics period
- However, it can be summarized that annual road maintenance processes are snow removal work in winter and cleaning work in off-winter seasons

5. Function and Utilization of Multi-Purpose Snow Removal Vehicles

- Process to design concept of multi-purpose snow removal equipment



- Step 1 : Using the functional decomposition method of Fadel and Kirshman

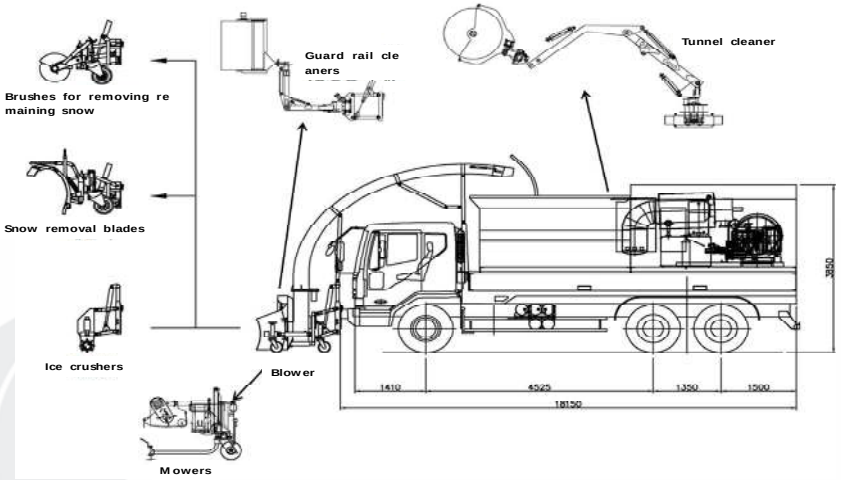
- Step 2 : Components were selected according to the decomposed functions

- Step 3 : The actual running states of components using an engineering analytical method

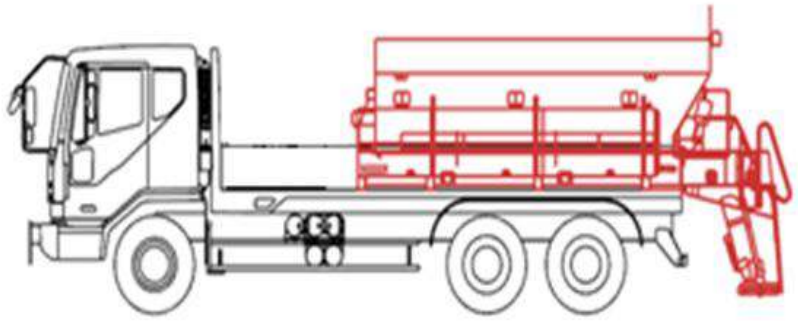
- Step 4 : Using the layout analysis, the size and appropriated position of each component were selected

5. Function and Utilization of Multi-Purpose Snow Removal Vehicles

- A unit equipment can be classified into two major types.
- One of them is a unit equipment mounted on the front
- The other is a unit equipment attached to a stacker.



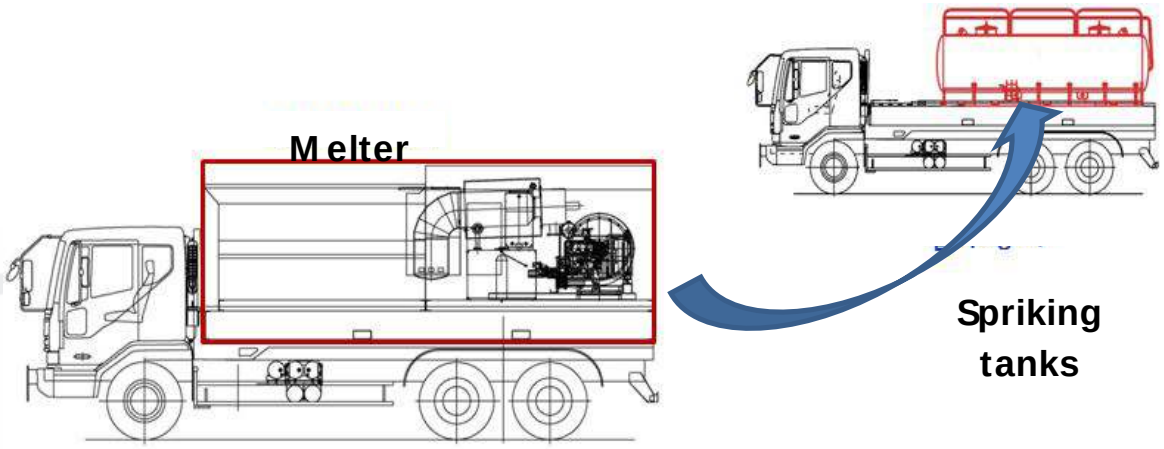
<Concept of a unit equipment>



<A stacker mounted unit equipment>

5. Function and Utilization of Multi-Purpose Snow Removal Vehicles

- All unit equipments with detachable melters can be used as a snow removal vehicle in winter
- With sprinkler equipments attached, they also can be utilized in cleaning work in off-winter seasons.



<A melter detachable>

6. Results

- Effective road snow removal work

To Collect immediately remaining snow	To accelerate further advancement	To increase the efficiency of roads	To improve the road safety effects of winter

- Daily road maintenance work

- To alleviate various issues than before
- To be utilized with appropriate personnel management
- To fit the budget of road maintenance
- Flexibly efficient to be used in daily multi purpose work in off-winter seasons

7. Conclusions

- Based on this study, we can promote the diversification of snow removal equipments by combining the multi-purpose snow removal vehicle with the technologies of existing snow removal equipments, enabling the export of the equipment to other countries overseas with climate characteristics similar to Korea.
- Through the exact analysis on climate, road traffic and existing road maintenance processes, substantial improvement on snow removal work is expected to produce more complete road maintenance guidelines in the field.

Thank You