

**ОСНОВНІ НАПРЯМКИ ДОСЛІДЖЕННЯ ДОВГОВІЧНОСТІ
АСФАЛЬТОБЕТОНУ ПРИ ВПЛИВІ ПРОТИОЖЕЛЕДНИХ
РЕАГЕНТІВ**

**THE MAIN AREAS OF RESEARCH ON THE DURABILITY OF
ASPHALT CONCRETE UNDER THE INFLUENCE OF ANTI-ICING
REAGENTS**

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In recent decades, the world's transportation industry has developed vigorously, and a large number of asphalt pavement have been built. However, the asphalt pavement in high latitude areas is covered with ice and snow for a period of time every winter, which will greatly reduce the traffic safety of the road and easily lead to traffic accidents.

Countries all over the world have carried out a lot of research on the problem of snow and ice on roads in winter. In order to ensure driving safety, the methods of road ice and snow removal generally include manual snow removal, mechanical snow removal and spreading deicing salt on the road, and spreading deicing salt is the preferred solution for ice and snow melting in winter because of its simplicity, efficiency and low cost. However, the extensive use of deicing salt will, on the one hand, bring long-term adverse effects on the living environment of the surrounding animals and plants, corrode the surrounding structures, and at the same time reduce the road performance of the pavement.

Influence of deicing salt on pavement performance of asphalt mixture under dry-wet cycle. Three deicing salts, NaCl, $\text{CH}_4\text{N}_2\text{O}$ and $\text{CH}_2\text{CH}_3\text{OH}$, are selected to conduct different times of dry-wet cycles for asphalt mixture in combination with the research results of the research group on the freezing point of deicing salts. The effects of deicing salts on the high-temperature stability, low-temperature cracking resistance and water stability of asphalt mixture are evaluated through high-temperature rut test, low-temperature crack resistance test, Marshall water immersion test and freeze-thaw splitting test.

Influence of deicing salt on water stability of asphalt mixture under freeze-thaw cycle. Three deicing salts, NaCl, $\text{CH}_4\text{N}_2\text{O}$ and $\text{CH}_2\text{CH}_3\text{OH}$, are selected to conduct freeze-thaw cycle test of asphalt mixture at different temperatures with appropriate concentration based on the research results of the research group on the freezing point of deicing salts. The effects of deicing salt on water stability of asphalt mixture at different temperatures were evaluated by Marshall water immersion test and freeze-thaw splitting test.

Influence of deicing salt on asphalt mixture under dynamic water scouring cycle. Three deicing salts, NaCl, $\text{CH}_4\text{N}_2\text{O}$ and $\text{CH}_2\text{CH}_3\text{OH}$, are selected to simulate the impact of dynamic water scouring on asphalt mixture under three deicing salt solutions by using the test equipment designed and assembled by the research group to simulate dynamic water scouring. The impact of deicing salts on the water stability of asphalt mixture under dynamic water scouring is evaluated through Marshall water immersion test and freeze-thaw splitting test.

Life prediction based on Grey theory. Based on the test data of Marshall water immersion test, freeze-thaw splitting test, high temperature rut test and low temperature crack resistance test, GM (1, N) model of grey system theory is used to predict the influence of deicing salt on mechanical properties of asphalt mixture under dry-wet cycle, freeze-thaw cycle and dynamic water scouring cycle.

Research ideas, methods and technical routes of scientific research are shown in Fig. 1.

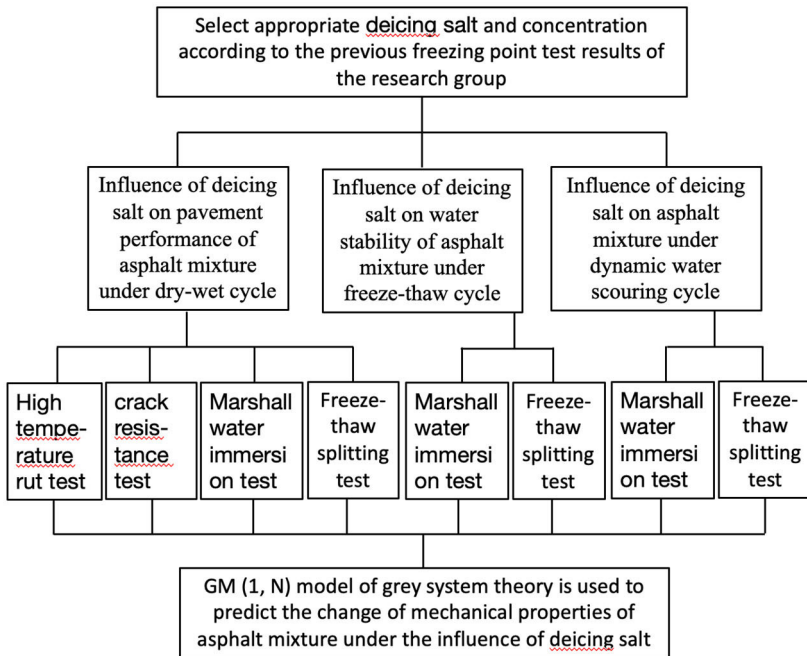


Fig. 1 Technical roadmap

By using the dynamic water pressure circulation simulation device designed and assembled by the research group, the dynamic water erosion of the asphalt

mixture by the deicing salt solution is simulated, which provides a basis for the short-term water damage law in the deicing salt spreading area.

As a result of the planned research, we will establish the regularity of the destruction of asphalt concrete under the influence of salt corrosion, which will make it possible to predict the durability of asphalt concrete from the influence of anti-icing reagents based on NaCl, $\text{CH}_4\text{N}_2\text{O}$ and $\text{CH}_2\text{CH}_3\text{OH}$ salts.

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