

2025

28th Presentation Session for Traffic Accident Investigations, Analysis, and Research

Analysis of Actual Accident Conditions Involving Vehicles Compatible with the 'D-Call Net' Automatic Emergency Call System and Approaches for Further Utilization

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1. Introduction

Figure 1 shows trends for numbers of traffic-accident fatalities in Japan. Although numbers of traffic-accident fatalities had been on a decreasing trend, they have remained flat in recent years. The number of fatalities in 2024 was 2,663, raising concern that the downward trend in numbers of traffic-accident fatalities may have come to an end. Automobile safety measures continue to evolve day by day, both in terms of preventive safety to prevent accidents and collision safety to reduce harm when accidents occur, resulting in increasingly safer vehicles. However, because many people are still the victims of traffic accidents, there is a need for further safety measures. With ‘enhancing rescue and emergency activities’ as one of its key pillars, the 11th Traffic Safety Basic Plan incorporates as priority measures the ‘establishment an emergency call system and automatic accident call system’, as well as the ‘promotion of helicopter emergency medical services (HEMS)’, and positions these as national goals for achieving a safe traffic society.

One way of achieving this goal is the utilization of the ‘D-Call Net’ Automatic Emergency Call System, which automatically sends emergency calls from vehicles involved in accidents.

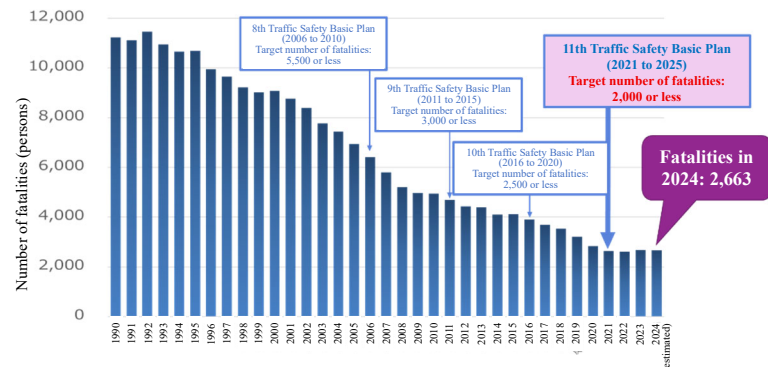


Figure 1. Trends in numbers of traffic-accident fatalities ¹

(*1: Fatalities occurring within 24 hours of the accident)

2. What is D-Call Net?

The ‘D-Call Net’ Automatic Emergency Call System detects the impact of a traffic accident requiring urgent response, automatically reports accident information from the vehicle to an emergency call center ^{*2}, establishes a call with the center, and rapidly provides the Fire-fighting Communication Command Room and the base hospital with information such as the vehicle’s location, vehicle data, and probability of fatal or severe injury, enabling the rapid dispatch of helicopter emergency medical services (HEMS) and doctor-staffed ground ambulances. The probability of fatal or severe injury is calculated using an injury-estimation algorithm based on information for approximately 2.8 million domestic accident cases maintained by ITARDA.

(*2: This center receives emergency calls and, on behalf of drivers and other parties, contacts emergency-response agencies with information useful for rescue activities.)

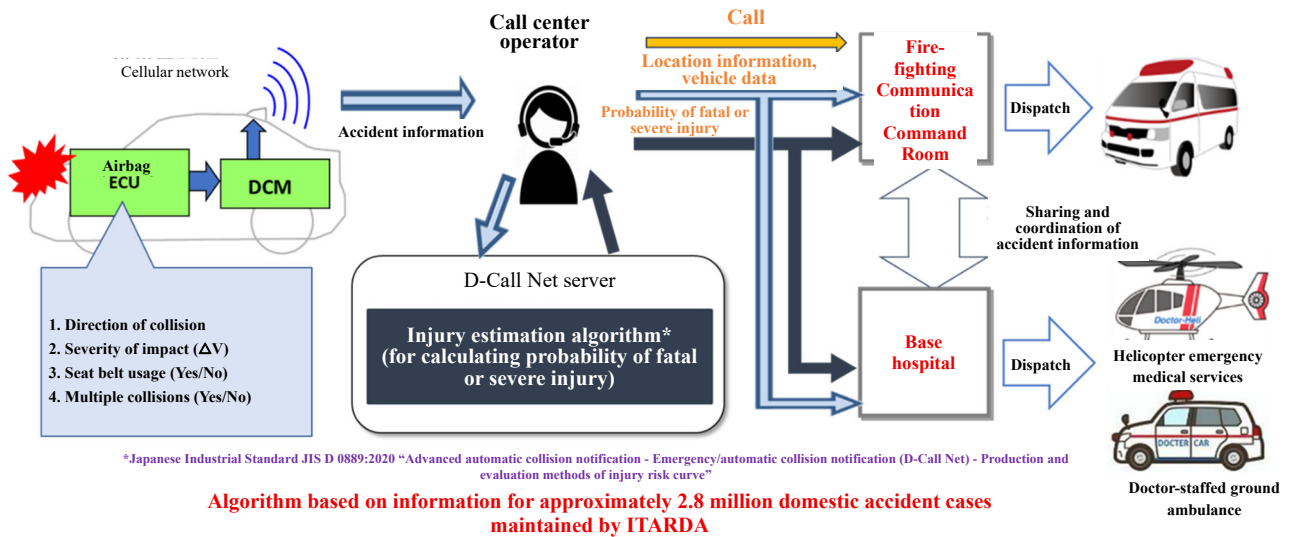


Figure 2. Overview of D-Call Net

D-Call Net is intended to enable the Fire-fighting Communication Command Room and base hospital to work together to rapidly and effectively rescue accident victims. According to field tests conducted in 2011, the time required for a physician to begin treatment was shortened by 17 minutes compared with normal operations (Figure 3). By utilizing data such as the probability of fatal or severe injury when reporting an accident, this reduction in time to treatment can lead to lower mortality rates and may help improve traffic-accident survival rates.

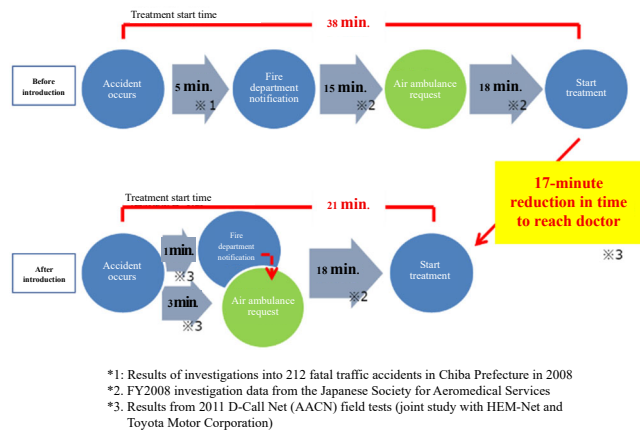


Figure 3. Comparison of time to treatment before and after the introduction of D-Call Net (Reference: HEM-Net Automatic Emergency Call (D-Call Net) Handbook)

3. Popularization

Figure 4 shows the cumulative number of vehicles manufactured in Japan by Japanese automakers equipped with AACN (Advanced Automatic Collision Notification) based on a survey by the Japan Automobile Manufacturers Association. Vehicles equipped with this AACN system are compatible with D-Call Net.

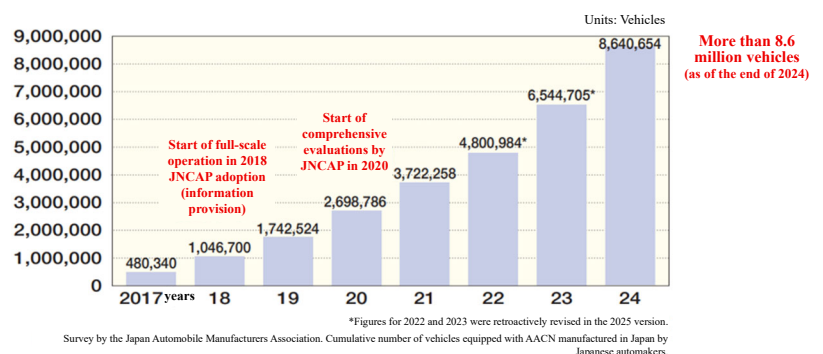


Figure 4. Cumulative number of vehicles equipped with AACN (Advanced Automatic Collision Notification) (Reference: 'The Motor Industry of Japan 2025' published by the Japan Automobile Manufacturers Association)

the Japan New Car Assessment Program (JNCAP), and in 2020, preventive-safety performance and collision-safety performance — which had previously been evaluated separately — were integrated into a single comprehensive evaluation of ‘automotive safety performance’. This integration is also believed to have contributed to the expanded adoption of AACN systems.

4. Status of D-Call Net-equipped vehicles based on actual accident conditions

4-1. Proportion of vehicles compatible with D-Call Net in traffic accidents

Macro data from ITARDA was used to examine trends in the proportion of vehicles compatible with D-Call Net (standard, compact, and light passenger vehicles) involved in traffic accidents. Although vehicles compatible with D-Call Net accounted for only 0.4% of all accidents in 2018, their proportion increased to 4.4% in 2021 and 13.8% in 2024 as the number of compatible vehicles increased.

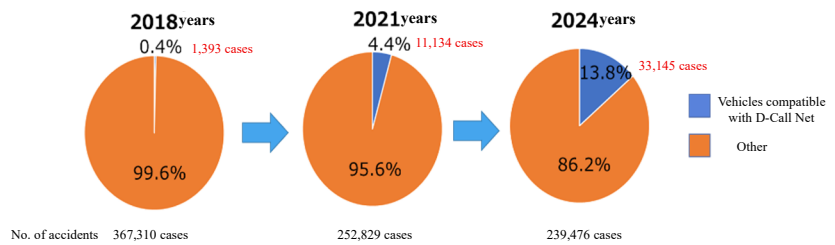


Figure 5. Proportion of vehicles compatible with D-Call Net in accidents involving passenger vehicles (standard, compact, and light passenger vehicles) (total for primary and secondary parties)

4-2. Range of accidents covered by D-Call Net

The current activation requirements for vehicles compatible with D-Call Net are accidents in which the vehicle experiences an impact above a certain threshold, such as when airbags deploy. Coverage is limited to accidents that occur while riding in a passenger vehicle, and only the occupants of that vehicle are covered. Figure 6 shows accident types for passenger vehicles in 2024. Single-vehicle accidents and vehicle-to-vehicle accidents comprise approximately 60%. Conversely, accidents involving pedestrians and ‘non-motorized vehicles’ such as bicycles account for approximately 40%. Because accidents involving such vulnerable road users rarely result in a vehicle impact strong enough to deploy the airbags or exceed the required threshold, they do not meet the activation requirements for D-Call Net. However, because accidents involving such vulnerable road users account for roughly 40% of all accidents, expanding applicability to these currently non-covered areas is desirable.

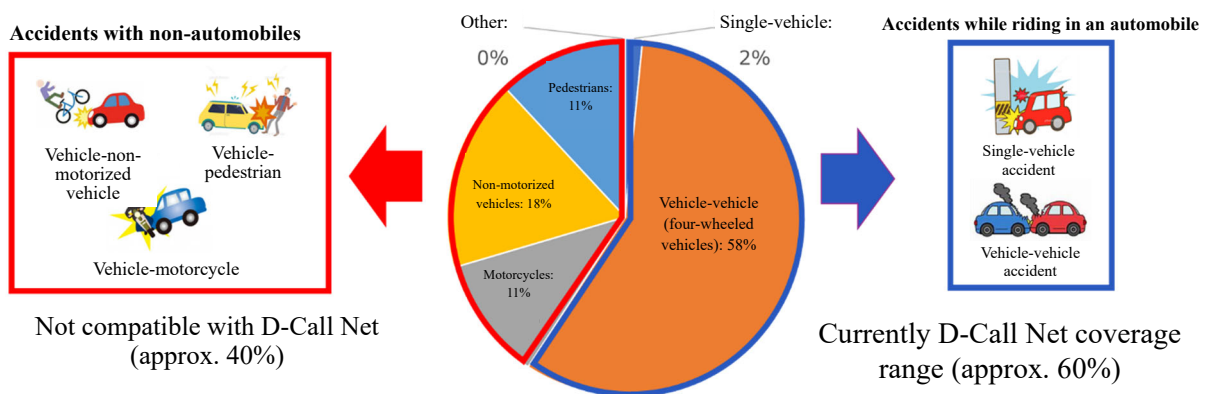


Figure 6. Accident types for passenger vehicles (2024, totals for primary and secondary parties)

4.3 Proportions of vehicles compatible with D-Call Net by vehicle class

Figure 7 shows proportions of passenger vehicle accidents by vehicle class in 2024. Light passenger vehicles account for the largest share at approximately 40%. We next examined the proportions of vehicles compatible with D-Call Net by vehicle class. Figure 8 shows trends in the proportions by vehicle class for 2018, 2021, and 2024. Because large passenger vehicles were the first to be equipped with D-Call Net when full-scale operation started in 2018, large passenger vehicles accounted for 96%. As adoption expanded to other vehicle classes over the years, the proportions of accidents involving not only large vehicles but also medium, compact, and light passenger vehicles increased by 2024. However, the proportion of light passenger vehicles remains low, making further expansion in applicability desirable.

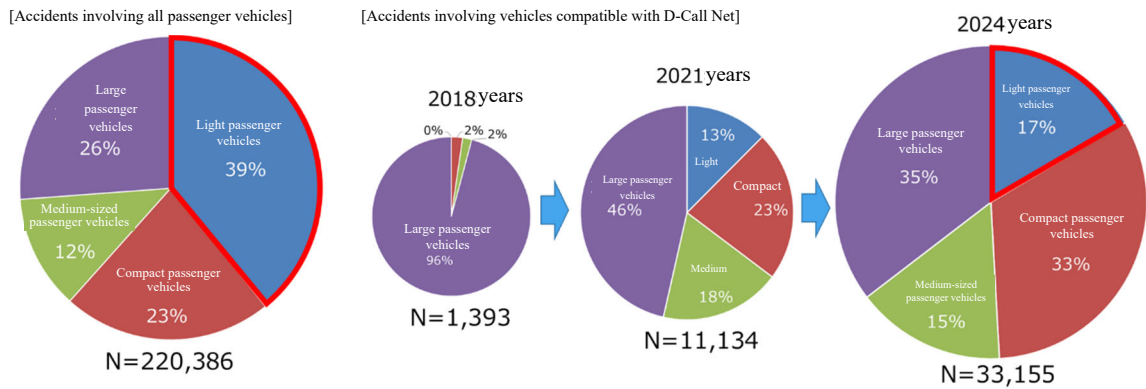


Figure 8. Trends in proportions of vehicles compatible with D-Call Net by vehicle class (totals for primary and secondary parties)

Figure 7. Proportions of passenger vehicle accidents by vehicle class (2024, totals for primary and secondary parties)

Figure 8

4-4. Comparison of injury severity between vehicles compatible and not compatible with D-Call Net

This study compared the injury severity of occupants in vehicles compatible D-Call Net and those not compatible. We analyzed injuries in single-vehicle and vehicle-to-vehicle accidents involving at least one vehicle equipped with the current D-Call Net system functionality. As a prerequisite, vehicles standard-equipped with D-Call Net across all grades were included, while vehicles in which it was standard on only some grades or available as an option were excluded. To minimize differences in preventive safety to the greatest extent possible, only vehicles equipped with an Advanced Emergency Braking System (AEBS) were included. Figure 9 shows the composition ratios of fatalities and serious and minor injuries in accidents involving vehicles compatible and not compatible with D-Call Net. This data shows that proportions of fatalities and serious injuries are lower for vehicles compatible with D-Call Net. However, because vehicles compatible with D-Call Net experience fewer accidents than those not compatible, it is essential to continue monitoring changes in proportions of injury severity as compatible vehicles increase in number.

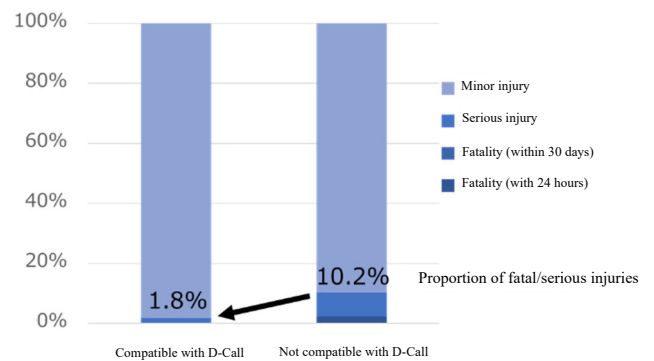


Figure 9. Composition ratios of fatal, serious, and minor injuries (excludes accidents with no injuries, 2024, totals for primary and secondary parties)

5. Examinations of Accident Cases Involving Vehicles With D-Call Net

In a 2024 study commissioned by the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) entitled “Investigation of Accident Cases for Automatic Emergency Call System (D-Call Net) through Medical–Engineering Collaboration”, 40 accident cases were examined. Of these cases, two involved accidents between vehicles compatible with D-Call Net, resulting in a total of 42 vehicles being examined.

This examination included 12 accident cases in which helicopter emergency medical services (HEMS) were dispatched, of which successful cases demonstrating the effectiveness of the D-Call Net system were also confirmed.

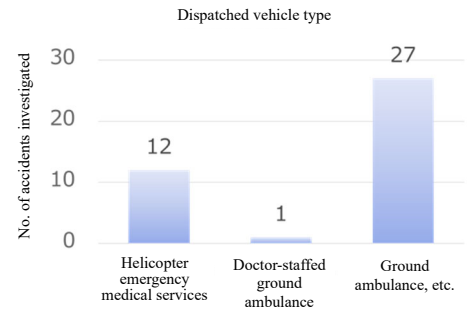


Figure 10. Dispatched vehicle types in examined accident cases

Table 1 summarizes the results of interviews with parties involved in the accidents examined in this study. Interviews included eight questions for which 33 valid responses were received. One notable finding was that for Question 4 regarding awareness of the D-Call system, 25 people responded “No” while one person responded “I don’t know”, meaning that 79% had no awareness

Table 1. Summary of interview results with parties involved (33 responses)

	Questions	Yes	No	Don't know/Don't remember
Q1	Have you heard of the HELPNET system?	23	10	0
Q2	Did your dealership explain its features?	24	6	3
Q3	Was the activation performed by the dealership?	23	3	7
Q4	Have you heard of the D-Call system?	7	25	1
Q5	Have you heard an announcement when connected to HELPNET?	9	7	17
Q6	Were you able to respond to the questions from the operator?	17	15	1
Q7	Did you exit the vehicle while the call was in progress?	11	21	1
Q8	In addition to the automatic call, did you also call emergency service numbers 110 or 119?	4	29	0

of it. For Question 5 regarding whether they heard the announcement when connected to HELPNET, 17 people responded “I don’t know” or “I don’t remember”, while seven people answered “I didn’t hear it”, amounting to 73%. It is likely that their state of confusion immediately following the accident prevented them from hearing the announcement properly. For Question 6 regarding whether they were able to respond to the operator’s questions, about half of the parties interviewed stated they were able to respond, while the other half were not. These interview results show considerable room for improvement, such as promoting awareness of the system and devising ways to communicate information more clearly even during the state of confusion immediately following an accident. On the other hand, in the section for additional comments, many respondents provided favorable remarks suggesting that the system is highly effective for those who have actually used it. These included comments such as “It was useful”, “The device saved me”, “Transport progressed smoothly”, “The quick response was reassuring”, “I’m happy this system exists”, “It was extremely helpful”, and “More people should be made aware of it”.

6. Summary

Usage of the D-Call Net service is one effective means of reducing traffic-accident fatalities. Vehicles equipped with this system are steadily becoming more common, increasing not only among large passenger vehicles but also among compact and light passenger vehicles. However, because approximately 40% of passenger-vehicle accidents involve light passenger vehicles, further expansions in coverage are desirable. Furthermore, because the current D-Call Net system does not cover all types of accidents, expanded coverage to accidents involving vulnerable road users such as pedestrians and bicycles is also desirable. This analysis also showed that proportions of fatal and serious injuries are lower for vehicles compatible with D-Call Net than those without. In the future, it will be necessary to continue monitoring how these proportions change as the number of vehicles compatible with this system increases. Additionally, by examining accident cases, we were also able to confirm successful cases demonstrating the effectiveness of the D-Call Net system. Finally, we consider continued outreach activities necessary to further expand awareness of the D-Call Net system.

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