2016

Directorate General of Highways, MOTC Annual Report

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Road Development - Driving Prosperity

Laying roads
is building dreams

We make sure that
people can meet safely

Each yard covered
makes people smile

Each mile of roadway
brings prosperity

Seventy years of sweat and faith
have built this solid legacy

The Provincial Highway workers will
carry on setting new milestones for
you

C O N T E N T S

Words from the Director-General

A journey of a thousand miles begins with a single step

Roads link cities with rural areas and connect people. Ever since its inception, the Directorate General of Highways has striven to create a safe, convenient, and economical road network. We do our best to provide the public with sustainable and high-quality public transportation services. The Directorate General of Highways has steadily worked on its two core businesses of public road projects and road supervision. Little by little, and with the hard work of all the members involved, we have planted the seeds for happiness.

However, road construction and maintenance cannot be achieved in a day. We pay continuous attention and devote to all process of the concert initiation , evaluation, planning, environmental assessment, budgeting, engineering design, bidding, construction, and acceptance. Only with time can results gradually be realized. Looking back at the past year, we have continued to drive major engineering projects such as the Danjiang Bridge, a new landmark in northern Taipei, and the mountain sections of Suhua Highway. After an international tendering process, Danjiang Bridge is now entering the expropriation of land and bidding stage. After many difficulties such as a tunnel collapse, flooding, and geology difficulties, the longest tunnel of Suhua Highway Improvement Project (Guanyin -Gufeng Tunnel) and Dong'ao Tunnel have finally been holing through. This indeed is joyful news.

In addition, the directorate general has continued to plan and link various traffic gaps and implemented engineering projects to ease traffic flow. The objective is to save driving time and improve traffic safety. Of these projects, the West Coast Expressway (Wanggong to Yongxing section) and the Provincial Highway No. 9 (Suhua Highway Dong'ao Dongyue Section) projects have received recognition by winning the Golden Quality Award of the Ministry of Traffic and Communications. This is a testament to our commitment to the high quality of public road projects. The initiation of Provincial Highway No. 9 Huatung Highway safety scenic boulevard design shows new thinking

in today's road construction. The new design thinking not only links existing road networks to make travel convenient, but also effectively integrates local characteristics, road scenery, traffic safety, and environmental friendliness. Road quality requirements are not limited to smoothness and convenience as in the past, but also pursue a safe and aesthetic experience.

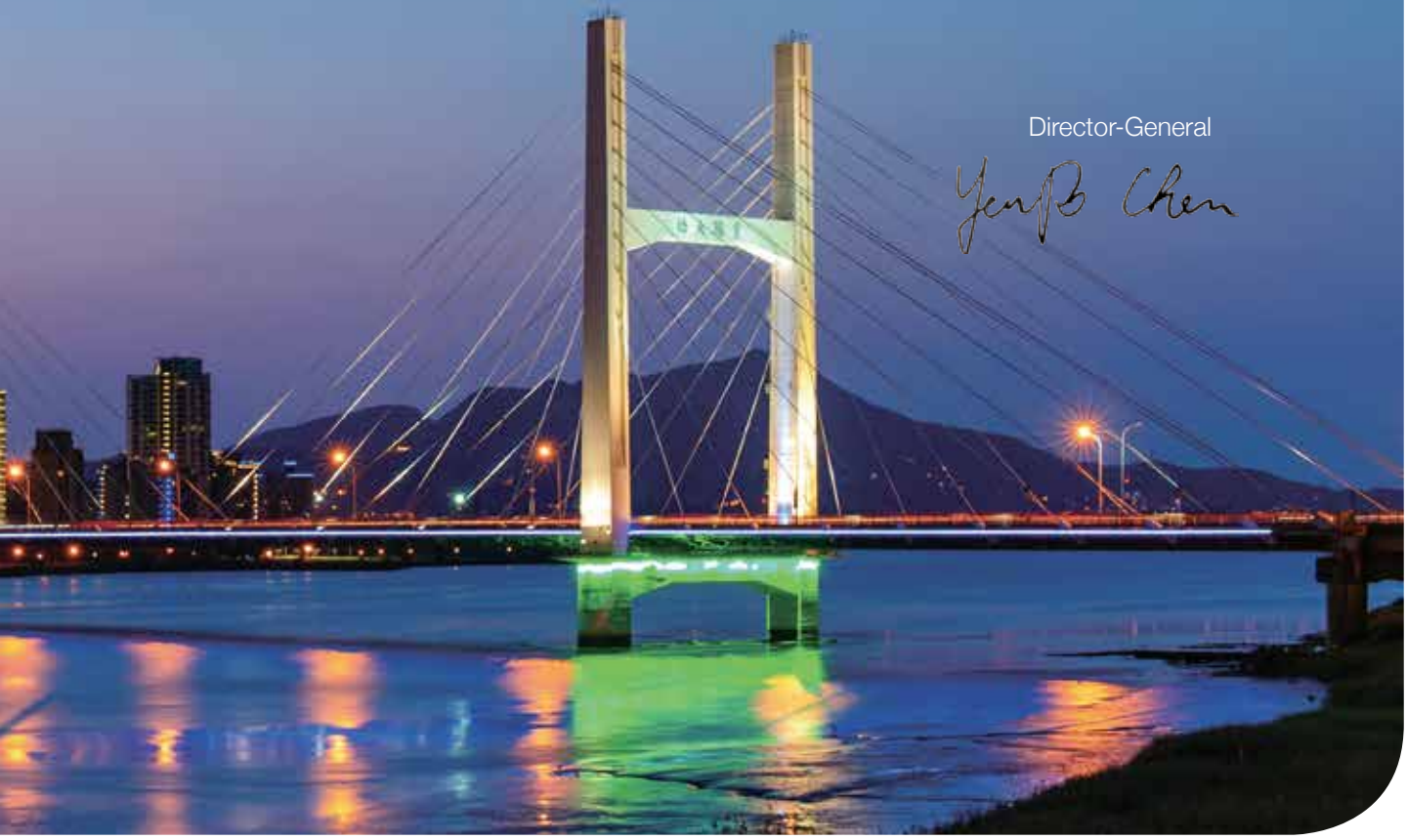
To pursue better road supervision service quality, we have continued to optimize the "Third-Generation Motor Vehicle and Driver Information System" under the premise of private information protection and data safety. This agency has pursued simplification of procedures and integrated related services. As a result, we won the 2016 Public Department Outstanding Technology Service Management Project Award, a category of the ITeS Awards, as well as the Government Service Quality Award. Furthermore, to improve road safety and reduce the number of accident factors, we are starting at the source. The agency is organizing regular driving instructor and lecturer training to improve the quality of these instructors, which will ensure that drivers have the proper safety concepts and skills to respond to the ever changing traffic environment. Many changes have been made to the driver management system, including the official implementation of motorcycle road tests, possible extension road safety workshop hours for drunk driving violations, vehicle road tests, and cognitive ability tests for elderly drivers. These changes are measures for promoting traffic safety and ensuring the life and property safety of road users.

Furthermore, we are driving the introduction of green low-carbon transportation as well as improving the service quality of public highway transportation. Focus items include bus status information systems for city buses, bus transportation entry into universities, and demand-responsive transit services for rural areas. The bus maintenance-and-inspection-in-one system is being implemented, which requires regular assessment of tour bus operators. Hopefully in the future effective traffic planning and governance can be used to give the public a harmonious and organized road environment.

Finally, please allow us to use this annual report to share with you this year's important road building and supervision innovations. We hope that the readers can provide suggestions and help us be better. Together, we can turn a new page for Taiwan's roads and transportation.

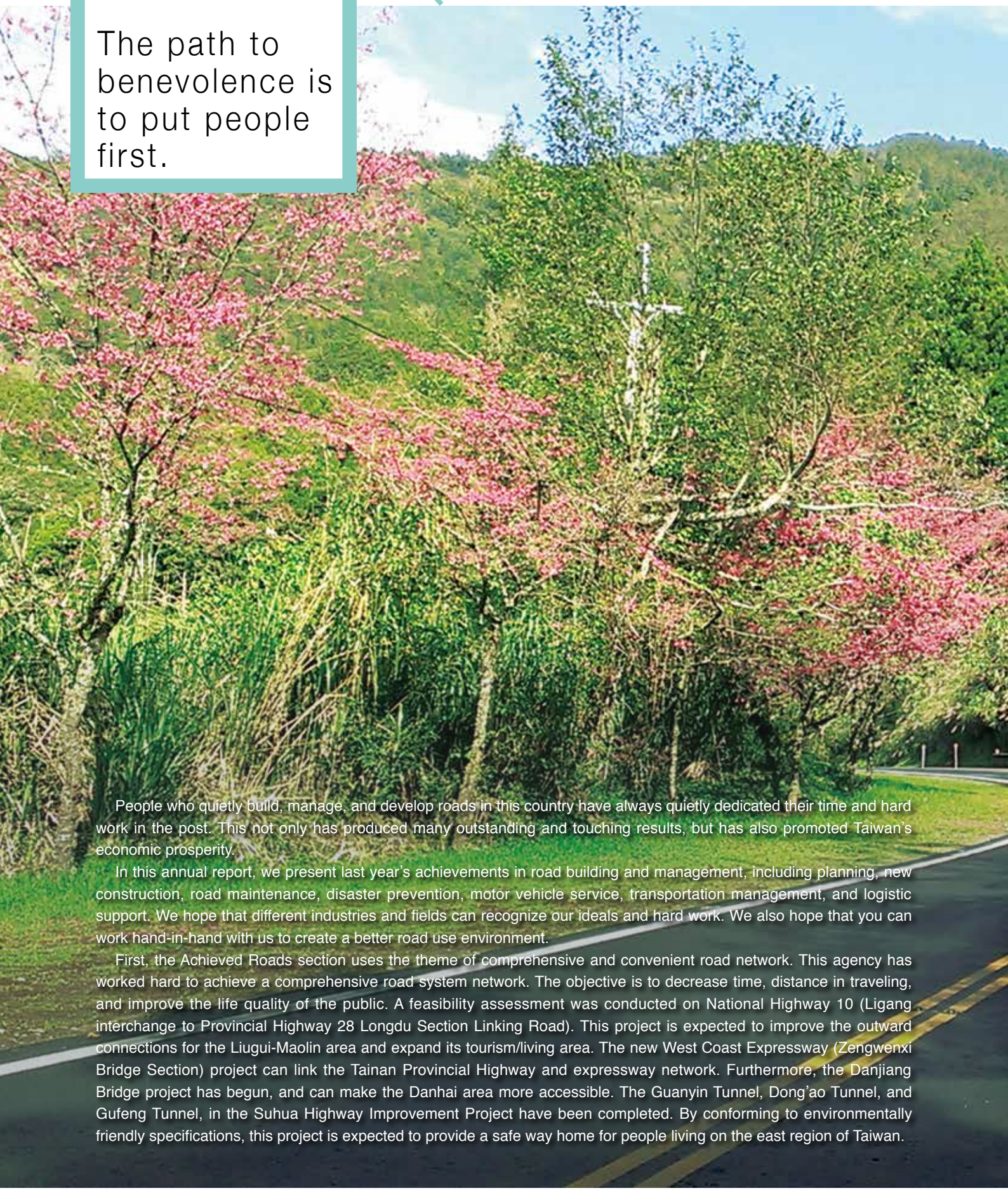
Director-General

Yung-Ben Chen



Overview

The path to benevolence is to put people first.



People who quietly build, manage, and develop roads in this country have always quietly dedicated their time and hard work in the post. This not only has produced many outstanding and touching results, but has also promoted Taiwan's economic prosperity.

In this annual report, we present last year's achievements in road building and management, including planning, new construction, road maintenance, disaster prevention, motor vehicle service, transportation management, and logistic support. We hope that different industries and fields can recognize our ideals and hard work. We also hope that you can work hand-in-hand with us to create a better road use environment.

First, the Achieved Roads section uses the theme of comprehensive and convenient road network. This agency has worked hard to achieve a comprehensive road system network. The objective is to decrease time, distance in traveling, and improve the life quality of the public. A feasibility assessment was conducted on National Highway 10 (Ligang interchange to Provincial Highway 28 Longdu Section Linking Road). This project is expected to improve the outward connections for the Liugui-Maolin area and expand its tourism/living area. The new West Coast Expressway (Zengwenxi Bridge Section) project can link the Tainan Provincial Highway and expressway network. Furthermore, the Danjiang Bridge project has begun, and can make the Danhai area more accessible. The Guanyin Tunnel, Dong'ao Tunnel, and Gufeng Tunnel, in the Suhua Highway Improvement Project have been completed. By conforming to environmentally friendly specifications, this project is expected to provide a safe way home for people living on the east region of Taiwan.

The Safe Roads unit is based on the concepts of roads that are high quality and always safe. This section shares the hard work that the Directorate General of Highways has done in road safety. The SafeTaiwan innovation provides a one-stop multi-element service platform. Users will see real-time information of typhoon, flood, earthquake, landslide, road obstructions, air quality, and environmental radiation through [Subscribe] and [Map]. The platform received the 2016 IT Month's Innovative Products Award. This is an outstanding and successful example of government agency information integration. This agency has established a Suhua Highway risk management model for extreme weather as well as improved typhoon/torrential rain response and warning system. In addition, the asphalt tile developed by the Materials Testing Laboratory is not only nicknamed "nemesis of potholes", but it has also passed national patent review, allowing us to take another step forward in public road maintenance technology.

Furthermore, we are also pleased to report excellent performance in our projects. For example, the Provincial Highway 17's Linbian Bridge has been completed, which significantly improves local traffic safety during typhoons and torrential rain season. Expressway 86's No. 24 bridge that was shifted by the Meinong Earthquake has been successfully returned to its position, and can serve as a reference for restoring and horizontally shifting non-steel structure bridges in the future. The Provincial Highway No. 9 - Huatung Highway Safety Scenic Boulevard Project widened Provincial Highway No. 9 and significantly improved its traffic safety. Provincial Highway 68's starting point link with the Hsinchu City Urban Planning Scheduled Road Project and the West Coast Expressway (Wanggong to Yongxing section) has been completed, and has brought convenient transportation and tourism to the local area.

Next, the Traveling Roads section is based on the theme of a "green road network and low-carbon future". This includes promoting high-quality public transportation service by both building a good foundation and driving improvements, progressive development of public bus transport for universities so that students are more willing to use public transportation to attend school, expanded promotion of demand-responsive transit service to take care of rural residents, including information for the status of 50 bus routes for 15 counties/cities in the iBus APP to increase rider convenience, and regularly commissioning professional teams to evaluate tour bus operators. The objective is to improve vehicle safety and service quality to create a more convenient and low-carbon traffic environment.

The objectives of the Implementing Roads section are innovative motor vehicle service and quality improvement. The focus of motor vehicle service is on the reporting of major initiatives. For example, introducing and implementing new motorcycle and car road tests for licenses (which require the driver to have practical road response ability), cognitive tests for elderly drivers (which lowers traffic risks), retraining for driver instructors (which improves instruction quality and the rights and interests of students), implementing maintenance and inspections in-one for bus operators (provides more safety for people traveling on buses), developing real-time vehicle photography tracking (recording the mileage when inspecting cars to safeguard consumer rights), and using signage to establish driving routes for vehicles transporting hazardous materials (controlling transportation of hazardous materials at the source). These have resulted in a significant increase in service satisfaction towards motor vehicle agencies and produce the highest survey results on record.

Cloud intelligence and public first is used in the Governing Roads section to describe the Directorate General of Highways' pursuit of service quality. Our services have always been geared toward the public, such as the 24-Hour Road User Service Line which receives good reviews, the Third-Generation Motor Vehicle and Driver Information System which won the 2016 ITeS Award (in the category of Public Department Outstanding Technology Service Management Projects), coaching car inspectors to build a trust-based culture, and organizing procurement personnel training.

Finally, the Happy Roads section collects all of the Directorate General of Highways' organization system, policy implementation, research and development, participation in competitions, as well as major events, budget implementation, and budget retention information. We believe that this can give society a more comprehensive understanding and fuller enjoyment of our smart traffic implementation and better quality of life.

Achieved Roads

Comprehensive and Convenient Road Network

Everything we do is to fulfill our promise to the public. The planning and building of each road is to make life more convenient and to link to the future. Thus, we are attempting to shorten time and distance to create a better blueprint. Although this task is daunting and the road is long, we will complete our mission.

12.226 km

It is 12.226 km from the Provincial Highway 10 Ligang interchange to Provincial Highway 28 Longdu section linking road. This can share the traffic burden of Provincial Highway 28.

Expanding the Liugui-
Maolin Tourism and Living Area

Provincial Highway 10 starts from Kaohsiung City's Zuoying District Wenzi Rd. in the west, and goes east through Renwu and Yanchao before stopping at Qishan. Currently, the Dingjin and Yanchao system interchange connects to Provincial Highway 1 and Provincial Highway 3, and provides a Provincial Highway/expressway system change service. Provincial Highway 10 terminates at Qiwei. To go further east, Provincial Highway 28 must be utilized to reach the Liugui and Maolin foothills area.

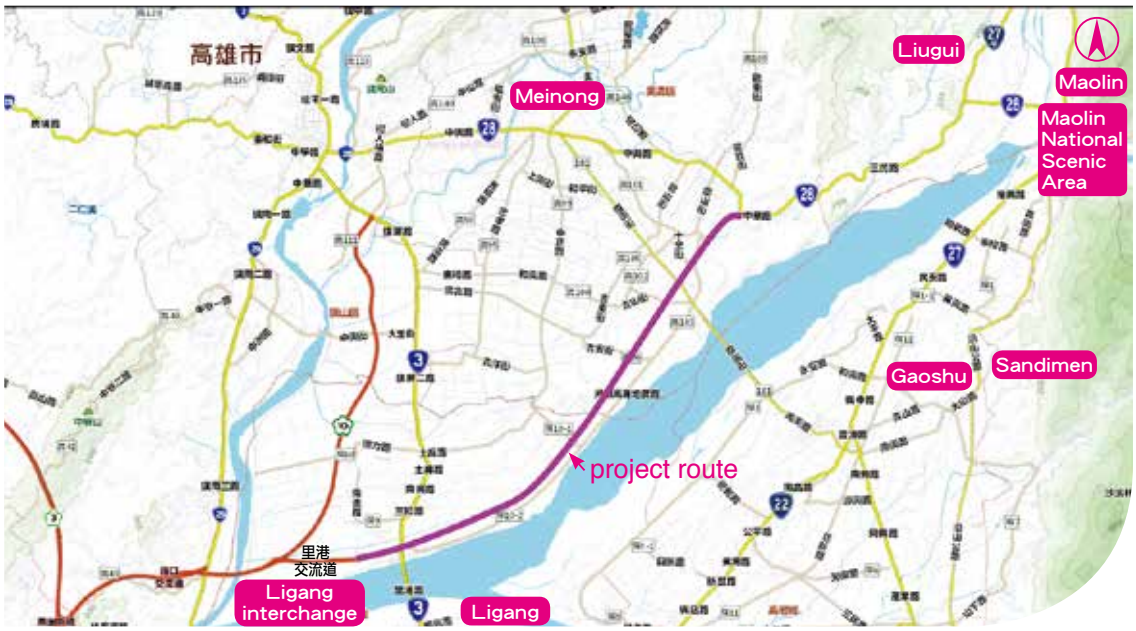
Improvement - Liugui Maolin external traffic link

Provincial Highway 28 was originally County Road 184 that has been upgraded to a provincial highway, and the original road width at the Meinong section was only 15 meters. Large trucks that transport agricultural foods and tour buses often pass this route and this can impact local traffic safety. Both through and local vehicle entry/exiting produces severe mutual interference and affects the service quality of local roads.

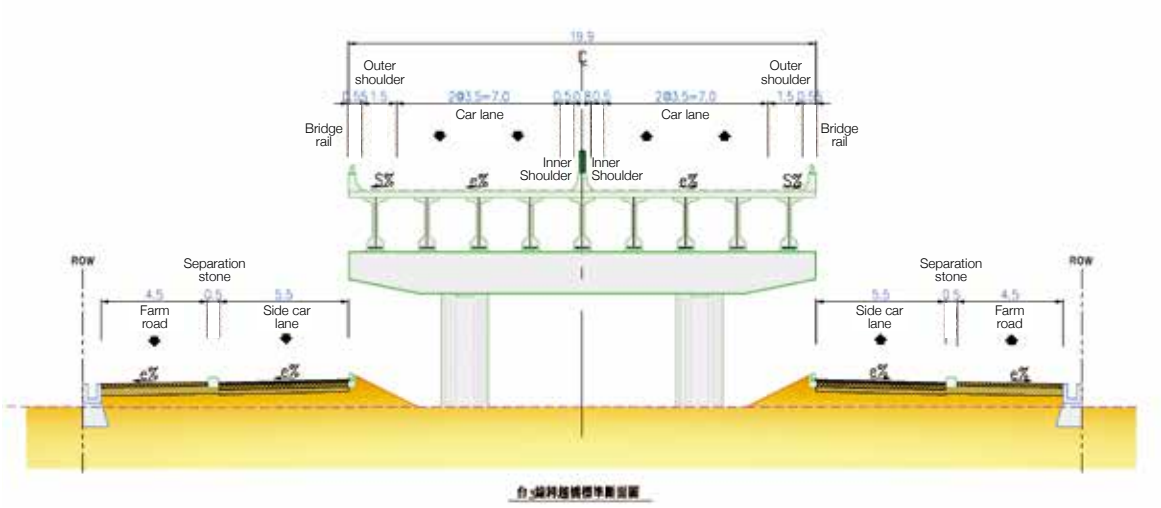
Weekend and weekday peak hours are especially congested on this section, and can severely prolong disaster relief and emergency medical transportation for the mountain areas, thereby wasting crucial response time. Therefore, local residents hope that external links to and from Liugui-Maolin can be improved. Studies show that extending the Provincial Highway 10 Ligang interchange link to the Longdu section Provincial Highway 28 is more beneficial. Thus, the Provincial Highway 10 Ligang Interchange to Provincial Highway 28 Longdu Section Linking Road Feasibility Assessment is mainly focused on the feasibility of the extension project.

Drafting – Overall Route Design and Planning

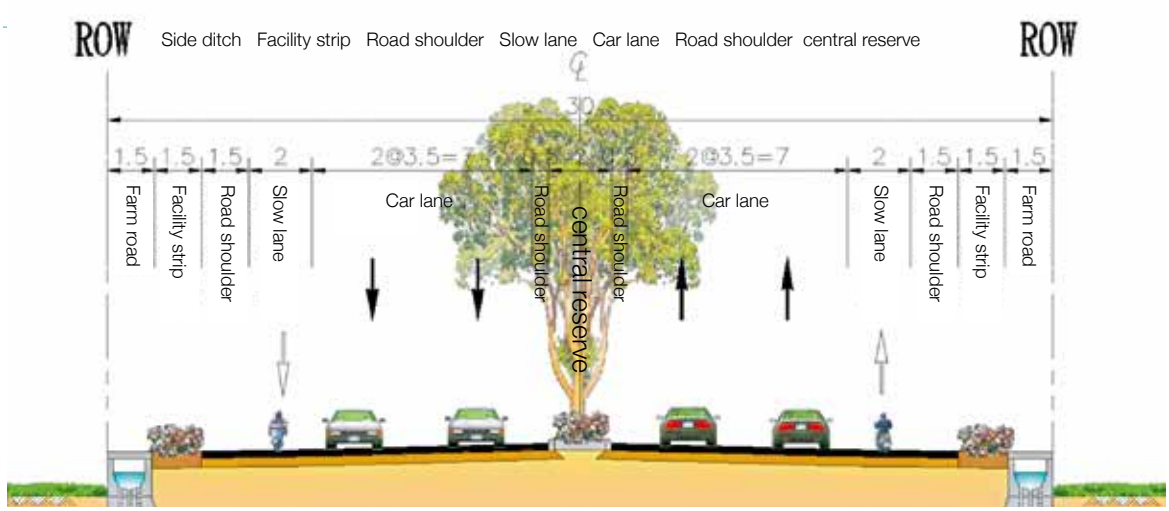
The process begins with route drafting. Three route plans were taken based on highway standards. The main traffic function is positioned as the "main highway". The designed speed is based on the area that the highway passes through (recommend 80 km/hour). The plan states that the Ligang interchange should start next to the 25K section of Provincial Highway 10, and that ramps and connecting roads should be used for the starting point. The 100-200 meter corridor north of the embankment that parallels the route turns northeast through Meinong after County Road 181. The route end-point connects to Shishan Village



Project route



Cross-section of elevated bridge



Cross-section of the surface road

Provincial Highway 28, around 40.5K. The entire length of this route is 12.226 km. The cross-section is separated in the middle, and both directions have two fast lanes and one slow lane. Future planning and design will conduct new forecasts and traffic lane allocation suitability based on new socioeconomic development conditions.

Building cost and expected schedule

The total building cost is estimated to be about TWD 2.898 billion. Follow-up work includes combined planning, environmental impact assessment, building plan reports, design, land obtainment, outsourcing, and construction. It is estimated that seven years will be required to complete the entire project.

This project is expected to share traffic load from Provincial Highway 28 and improve the service standards of local roads, as well as provide the Liugui and Maolin area with a route for disaster rescue and relief. The new road will link with the Liugui area and connect with the Maolin National Scenic Area and the Provincial Highway system. Higher service level outside-linking road systems can be used to improve the Maolin National Scenic Area's outward connecting road system, make the system more complete, and increase tourism and leisure.

Provincial Highway 28's Zhongtan section is in close proximity to city traffic. This project can be used to divert product transportation vehicles to and from the Liugui and Maolin area, lower the impact on and interference with city traffic, and improve the safety of local traffic. In addition, this project can improve east-west traffic between Pingtung County's Ligang and Gaoshu with downtown Kaohsiung City, Meinong, Liugui, and Maolin.

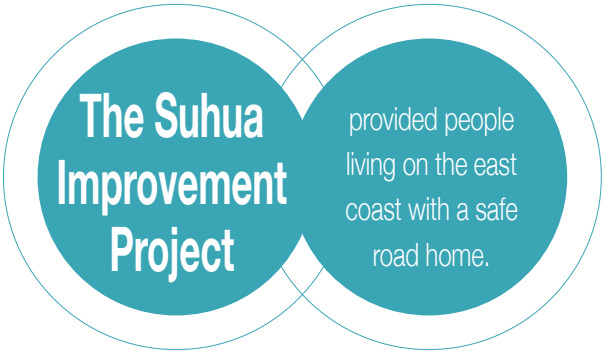
In summary, it is expected that this project will not only can expand the service scope of the Provincial Highway system and improve accessibility from the region's roads to the Provincial Highway, but also improve the transportation benefits of the Ligang interchange and give a boost to the local tourism industry.

The Suhua Improvement Project's Guanyin Tunnel is Complete

Provincial Highway 9 (Suhua Highway) is situated next to the Pacific Ocean and faces weathering and falling rocks. These falling rocks cause harm to road users and result in increased road maintenance costs, as well as significantly affecting social cost, perception, and government financial burden. To respond to east coast residents' appeal for a safe road home, in taking into account environmental friendly concepts, the Suhua Highway of Provincial Highway No.9 Mountainous Section Improvement Project was initiated in 2010.

Diverse Integration Taking Care of People and Culture

Numerous measures were set up in the project to consider construction, environmental, and safety matters. The management is based on a minimum bidding construction procurement and labor safety and health partnership plan. An environmental protection supervision team was established to ensure environmental friendliness and drive biological indicator research and carbon management plans. A fog spray and compound dotted-row type ventilation system was used for electromechanical traffic control.



Overcoming Challenges Bountiful Results

During the project implementation process, we encountered multiple tunnel collapses, flooding, and geology difficulties. The construction team investigated and used seismic detection to understand the geology before deciding to use such auxiliary methods as site improvement and pipe umbrella roofing as well as small excavation areas, compact construction spaces and fast construction of supports to pass areas with weak geology. The Guanyin Tunnel, the longest tunnel in the Suhua Improvement Project was completed on May 3, 2016. In the same year, the Dongao and Gufeng Tunnels were also completed.

Get Home Safe Completing as Expected

The implementation of the Suhua Improvement Project met with many difficulties, but the construction team still moved bravely forward with persistence to safely and successfully overcome the obstacles. They completed this extremely difficult task and fulfilled this agency's promise. Under the premise of environmental protection, they provided people living on the east coast with a safe road home as expected, and helped promote local economic development and tourism. As a result, the Yilan and Hualien area has a new look.

Guanyin Tunnel completed

Gufeng Tunnel completed

Connecting the Tainan Provincial Highway and Expressway Network

In 1991, Taiwan's western corridor (north-south direction) already had the Sun Yat-sen Provincial Highway, the West Coast Expressway, vertical Provincial Highway 1, and inland Provincial Highway 3. However, because these routes passed through many towns and cities, they could only serve as local area traffic. The north-south city-to-city transportation traffic was mostly concentrated on National Highway 1 and Highway 3 that was just completed in the north. As a result, most sections were saturated, and certain parts were reduced to regular road service standards on weekends.

West Coast Expressway From Zengwenxi North Coast

To solve this problem, the Executive Yuan passed the West Coast Highway Upgrading to Expressway Construction Project at its 2257th meeting in November 1991 and listed this project as one of the nation's six year construction projects. In December of the same year, the Executive Yuan submitted a proposal to Taiwan's government, pending implementation after approval by the MOTC.

The West Coast Expressway's original planned endpoint passed Tainan's Anping to the Golden Coast. In 1998, after the second revision, the planned route was moved to outside the seawall because Tainan City Government was planning the Sicao Mangrove and other environmental preservation areas. Because the planned route had to be coordinated, the project's implementation scope reached to Zengwenxi's north shore.

After the West Coast Expressway's Badongliao to Jiukuaicuo section main route was completed, travel to Provincial Highway 8 (connecting to Provincial Highway 1) and travel into Tainan City required turning left through Taiwan County Road 173, then turning right on Provincial Highway 17 southbound into the city, then turning left on Provincial Highway 17b (Taijiang Boulevard) to connect to Provincial Highway 8. Because there are numerous traffic lights in the city area, the driving speed was limited.

Connecting to Zengwenxi Bridge Increasing Operating Efficiency

To reduce the impact of outside traffic on local traffic after completion of the expressway, the Directorate General of Highways held a West Coast Expressway Zengwenxi Bridge feasibility assessment. The Executive Yuan issued document number 1050092064 on September 30, 2016 in agreement with the implementation of the plan. The Directorate General of Highways proceeded with the environmental difference and wetland-related review procedures. After the procedures were completed, the Directorate proposed a construction plan.

After the West Coast Expressway crosses Zengwenxi, it can connect urban planning roads 2-7 directly to Provincial Highway 17b to connect to Provincial Highway 8. This can form a greater Tainan Provincial Highway and expressway network with Provincial Highway 8, Provincial Highway 1, Provincial Highway 3, and Expressway 84. This network can effectively expand the service scope of the Provincial Highway and expressway road network and improve the operating efficiency of the southern section of the West Coast Expressway.

Initiating the Danjiang Bridge Construction

In recent years, the northern coastal region has been developing rapidly. The building of the Taipei Harbor, the development of the new Danhai area, planning of corresponding outward connecting traffic system, Fishermen's Wharf, the Shihsanhang Museum of Archeology, and other leisure sites are being completed. Providing a convenient traffic network that connects these locations is an important action item that cannot wait. Thus, the government is actively promoting the building of the Danjiang Bridge and Linking Road Project at the mouth of the Tamsui River (between Tamsui District and Bali District) to improve traffic congestion on the Provincial Highway 2 Zhuwei section and Guandu Bridge.

Danjiang Bridge is 6 km in length and the project is divided into three project tenders. The total cost is approximately TWD 15.43 billion. The first tender project was completed in November 2016. The second tender's project scope includes New Taipei City's Bali District and Tamsui District. The Bali end is approximately 2.4 km and the Tamsui end is approximately 1.16 km. This tender began on March 1, 2016, and is expected to be completed in 2020.

Selecting an International Team Creating New Landmarks for Northern Taiwan

To realize its environmental promise, the form of the Danjiang Bridge's main body (3rd tender) was determined by an international competition, which attracted professional international design teams. The selection committee included government agency representatives, domestic and international experts and scholars, and local artists. The form of the main bridge was selected based on its appearance and its meaning. These criteria were used to select a bridge form that takes into account the sunset view, culture, and environmental needs, and the sustainable development of wetland ecology so that Danjiang Bridge can become a new northern Taiwan landmark that benefits both traffic transportation and the economy.

Artist impression of nightscape – yacht harbor

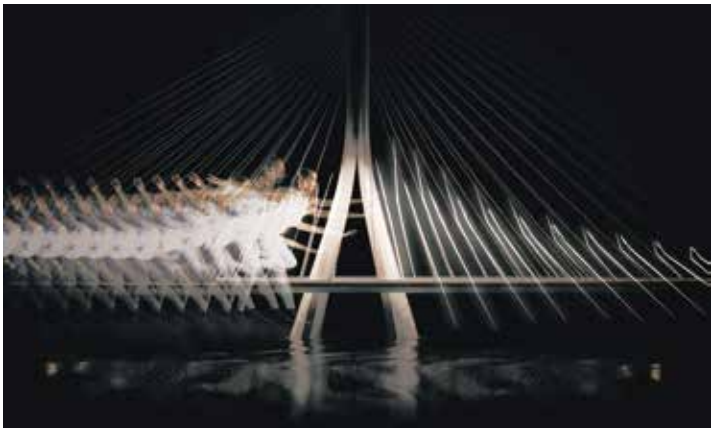
Car driver visual scape

The winning tender went to a collaborative team of Leonhardt Andra und Partner Beratende Ingenieure VBI AG of Germany and Sinotech Engineering Consultants. The tender was announced in November 2016 using the most advantageous tender method. Work is expected to start in 2017.

Shortening Commute Time Opening up Danhai's Convenient Living

After the project is complete, traveling from Tamsui and the North Coast to Bali, Wugu, and Taoyuan no longer will require going across Guandu Bridge. This can shorten the distance by approximately 15 km and reduce driving time by about 25 minutes. Furthermore, this can decrease traffic congestion on Provincial Highway 2's Zhuwei Rd. section and Guandu Bridge. The expected benefits are as follows:

1. Effectively link the Bali and Tamsui living area and improve residential and living quality: the Tamsui District and Bali District on the left and right bank of the Tamsui River each have their own economic tourism development and convenient transportation. If a bridge can be built to link the two shores, this can sufficiently integrate and utilize the advantages of these two areas and help the areas complement each other. The result will be an aesthetic environment that can maintain local traditions and cultural connotations, and allow sustainable development of modern cities and towns.
2. Improve Danhai's external traffic link: it can bring reduced travel time, driving costs, accident costs, air pollution, and other tangible and intangible economic benefits. In addition to being of great benefit to Taipei Harbor's logistics development, this can make the northern coastal highway system more complete, reduce driving time, and promote the development of the tourism/leisure industry.
3. Provide a more convenient traffic network: cooperate with the Taipei Urban Area Expressway System Development Plan to form a more complete expressway network and expand road the service scope. Further link tourism and leisure activities on the two banks of the Tamsui River with the light rail MRT and promote urban and industry development.



Bridge concept – Cloud Gate dancer

Tamsui sunset

Increasing the Obtainment of Private Roads

To insure the people's property rights, the Judicial Yuan Grand Justices' interpretation No. 400 stipulated that when an existing road meets certain conditions and establishes a public land easement relationship, and the owner no longer receives benefits from free use of the land, this justifies a special property benefit sacrifice for public welfare purposes. In this case, the government shall proceed with expropriation according to the law and provide compensation. If any government levels have financial difficulties, and cannot provide all the expropriation compensation for the aforementioned roads, relevant agencies shall establish deadlines for raising financial resources annually or use other methods for compensation.

Limited Financial Resources Solving Compensation Problems

Because private roads are not compensated according to law is a national issue, and various levels of government do not have sufficient financial resources, many roads have been put to public use for long periods of time while compensation has been postponed. A tally of the system shows that there are over 550 ha of private roads in the provincial highway system. The Directorate General of Highways discussed the matter and decided on the following methods to ensure owner rights while considering limited financial resources to gradually solve the compensation problem:

1. Incorporation into the annual project expropriation or purchase:

When road widening or improvement plans are held each year, the cost of private roads should be included in the project budget. The expropriation or the purchase of these private roads should be listed within the scope of the project plan.

2. Capacity transfer:

If the road belongs to the provincial highway public facility reserve, the owner can transfer the property to the state according to the Regulations of Urban Building Capacity Transfer. After the transfer and obtaining the transferred capacity, the area can be added to houses or additional floors when constructing.

3. Accepted donations:

Owners can gift the property to the state, and the Directorate General of Highways will accept the gift according to the National Property Act.

4. Public and private land exchange:

The owner can apply for public land exchange according to the Urban Planning Private Public Facility Reserve Land and Public Non-Public Use Land Exchange Regulation.

5. Tax offset:

Owners can apply for a tax offset according to the relevant tax laws.

Showing Realistic Results Since Implementation

The aforementioned five methods were implemented by the Directorate General of Highways after approval by the MOTC in 2014. Since their implementation, private roads were mainly obtained through incorporation into the annual project expropriation or purchase. The next most common method was capacity transfer and accepted donations. Of the methods, public and private land exchange and tax offset are negative compensations, and have not been used so far.

The survey showed that more than TWD 80 billion in 2016 market price was needed to obtain private roads required for provincial highways. The actual implementation results of the Directorate General of Highways from 2014 to 2016 are as follows:

List of private road lands areas obtained by the Directorate General of Highways, from 2014 to 2016

Year obtained	Incorporation into the annual project expropriation or purchase			Applied for capacity transfer			Accepted donations			Total		
	Number of land	Area (ha)	Price (TWD 10,000)	Number of land	Area (h)	Price (TWD 10,000)	Number of land	Area (ha)	Price (TWD 10,000)	Number of land	Area (ha)	Price (TWD 10,000)
103	199	4.002611	95,606.98	81	0.3630	28,098.9	0	0	0	280	4.365611	123,705.88
104	79	3.367595	8795.60	158	0.5880	31831.5	1	0.000053	0.15	238	3.955648	40,627.25
105	34	0.166283	4,835.66	28	0.1551	11176.5	0	0	0	62	0.321383	16,012.16
Total	312	7.536489	109,238.24	267	1.1061	71,106.9	1	0.000053	0.15	580	8.642642	180,345.29

Safe Roads

High Quality and Always Safe

Our only hope is to realize road convenience, stable bridges, smooth driving, and pedestrian safety for our roads. This extends to construction, post-disaster repairs, and warning in natural disasters. That way, our comprehensive road system can be used by anyone to go anywhere smoothly and safely.

186 km

Provincial Highway 9 (Hualien to Taitung section) is 186 km long, and is the most important traffic artery for the East Rift Valley. This is also the traffic artery that connects various towns, cities, and populated settlements along the east coast area.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禁行大

Linbian Bridge Brings New Hope

Pictures after completion of the project and opening to traffic

To improve the earthquake resistance of provincial highway bridges, the MOTC reported to the Executive Yuan in January of 2009. The report focused on completed and in-service provincial highway bridges over 6 meters long, and ranked bridged reinforcement based on an index that included loss risk value, reinforcement benefit, and importance. Overall, 339 provincial highway bridges were selected for earthquake reinforcement. In four years, from 2009 to 2012, TWD 8.5 billion was invested in earthquake reinforcement projects to provide a basic infrastructure with high traffic safety. The Provincial Highway 17 Linbian Bridge improvement project was part of this initiative.

Bridges with Insufficient Earthquake Resistance were Dismantled and Rebuilt

The old Provincial Highway 17 Linbian Bridge was completed in 1971, and was widened in 1983. It serves as the main local connection road, and often becomes congested on weekends when there is more traffic. To ensure the structural safety of the bridge, the Directorate General of Highways' Third Maintenance Office completed the Linbian Bridge Earthquake Resistance Capability Analysis and Report in December 2010. The report stated that the bridge had insufficient earthquake resistance and did not conform to water management requirements, and recommended that the bridge be disassembled and rebuilt. Thus, rebuilding was implemented.

The construction scope is on Provincial Highway 17 (263K+480-264K+105 section). The road width is 19 meters and the total length is 625 meters. The main bridge is divided into two units. The first unit is the single-span 35 m steel box girder bridge. The second unit is the five-span

Pictures after completion of the project and opening to traffic

combined 400 m continuous steel box girder bridge. The Linbian-end 100 meter approach road widening includes the traffic through box culvert rebuilding. The Jiadong-end is a 90 meter approach road widening. The construction began on October 30, 2014 and was completed on September 21, 2016.

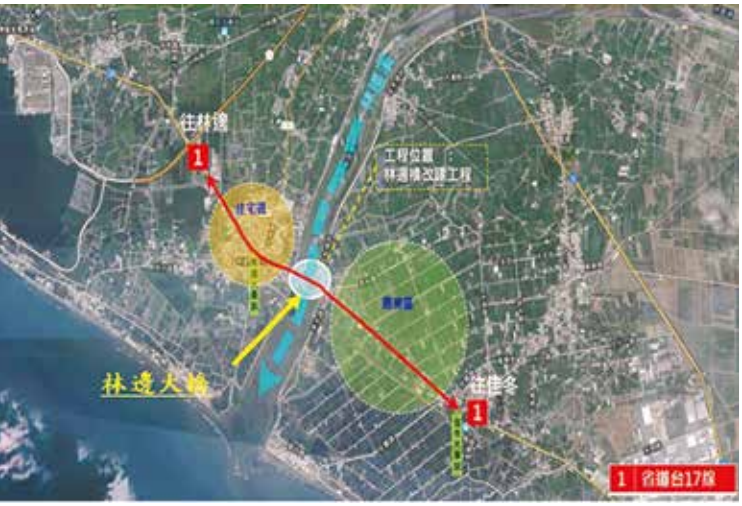
Safe and Secure Steel Bridge Completed as Planned

First, the upper structural part of the bridge used a steel bridge design. This reduced weight and shortened construction time. The objective was to meet the country's overall sustainable development and carbon dioxide reduction policy. To reduce erosion of the bridge foundation, the steel bridge employed a large span design. This reduced the number of originally designed piers by five and increased the water passage cross section. The bridge cross section utilized a curved design that integrated local scenery and produced an elegant and smooth bridge.

Next, to maintain traffic during the construction period, a temporary steel bridge was maintained on the left side of Linbian Bridge. Even though the area experienced multiple typhoons and torrential rain during the construction period, the supervision of the branch and vendors all worked hard on the construction and cooperated with higher level agencies in the audit. The project received great reviews for various construction quality management items, and was completed on time.

Improving Driving Safety and Promoting Local Prosperity

After the Provincial Highway 17 Linbian Bridge was completed, it not only solved the bridge aging problem, but also had a great effect on local flood control. This not only improved driving safety during typhoons and torrential rain, but also created convenient road access for Jiadong, Donggang, and Linbian. The project improved local development and tourism, and brought significant benefits and prosperity to the Pingtung area.



Location of the Provincial Highway 17 263K+805 Linbian Bridge rebuilding project

Linbian Bridge integrated the imagery of the local specialty, Linbian wax apple

Driving the Nanliao Living Area

The service scope of the east-west expressway Nanliao-Zhudong line (aka Expressway 68) extends from Zhugang Bridge to the Zhudong end of Provincial Highway 3. It has been over 14 years since the road opened at the end of September 2002. During these years, the road not only effectively relieved traffic growth in the Hsinchu city area, but also linked the vertical direction highways and Nanliao, promoted balanced development of the Hsinchu area, and improved overall transportation effectiveness in the Hsinchu living area.

Shortening Driving Distance Reducing Congestion

In recent years, Hsinchu City Government greatly promoted tourism, and successfully turned Nanliao Harbor and the 17 Kilometer Coastline into a tourist area. Each weekend large volumes of traffic and people enter the area. Consequently, Provincial Highway 15's Zhugang Bridge that goes to the Nanliao area not only becomes congested easily, but often has traffic accidents. To solve these problems, the Expressway 68 Starting Point Link to Hsinchu City Urban Planning Predetermined Roads Construction was initiated. Traffic going to and from the Nanliao area can directly link to the Hsinchu City Urban Planning Road (Rongbin Rd.) from the starting point of Expressway 68. This shortens the travel time by approximately 10 minutes and can alleviate congestion of the West Coast Provincial Highway 15 (Zhugang Bridge), as well as improve the function of the east-west expressway.

The Expressway 68 Starting Point Link to Hsinchu City Urban Planning Predetermined Roads Construction is 423 meters in length, of which, the embankment section is 118 meters, the bridge section is 246 meters (the field support section is 120 meters with three consecutive crossings, the cantilever bridge section is 126 meters with 2 crossings) and the connecting old Expressway 68 approach bridge is 59 meters. The project was organized by the Directorate General of Highways' First Maintenance Office and constructed by the Hsinchu Branch. The design company was Taiwan CECI and the contractor was Ancang Construction Co. Ltd. The total construction cost was TWD 260 million. The project began on November 17, 2014, and was completed on July 4, 2016. On October 28, the road opened to traffic in conjunction with the completion of Rongbin Rd.

Insufficient Height Reduced Traffic Lane

The greatest challenge encountered in this construction project was the cantilever bridge method used for crossing over Provincial Highway 15 Zhugang Bridge. Because the project needed to link with the old Expressway 68, the formtraveller that

Aerial night picture after completion of the project

Provincial Highway 68 extension floor diagram

pushed the cantilever into Provincial Highway 15 Zhugang Bridge was short by about 3.5 - 4.5 meters. This created the need to seal off the formtraveller's operation area and reduce the Provincial Highway 15 Zhugang Bridge car lane as the formtraveller pushed forward.

To cooperate with work on the cantilever bridge, the eight stage Zhugang Bridge route change and traffic maintenance (reduced by 1 or 2 lanes) was implemented once every two or three weeks during the construction period. However, the construction period also overlapped with the 2016 Chinese New Year. Local government and police units both requested that the road be returned to normal traffic during the Chinese New Year period. However, supervisory unit and vendor assessment showed that if the formtraveller was removed to maintain normal traffic during the Chinese New Year holiday, the additional disassembly and assembly cost of the formtraveller would need to be added, and the completion date for the project will be postponed by at least two months. Finally, an agreement was made with local agencies to maintain traffic control during the holiday period.

Everyone's Hard Work Made the Change Smooth

When the construction encounters commuter hours, local police directed traffic and vendors asked local volunteer traffic directors to help with traffic flow until such time that traffic maintenance was no longer needed. This ensured that the road section had smooth traffic. The cantilever bridge construction that crossed Provincial Highway 15 Zhugang Bridge took five months. The traffic maintenance during this period was the biggest challenge because we needed to prevent traffic accidents and public complaints. Luckily, with the hard work of all the people involved and sufficient communication and information transparency, road users were able to know the traffic situation. This enabled road users to change lanes early to prevent traffic congestion.

Although the Expressway 68 Starting Point Link to Hsinchu City Urban Planning Predetermined Roads Construction only affected a small section of road, it was a significant benefit for traffic on Expressway 68. Traffic on this section drove tourism and resulted in significant benefits for the Nanliao area.

Picture of the bridge underside after completion

Construction pictures

The First Safe Landscape Boulevard on the East Coast

poinciana flowers along Provincial Highway 9 (Fuli section).

Provincial Highway 9 (Hualien to Taitung section) is 186 km in length, and is the East Rift Valley's largest main traffic artery. This highway also links major towns, villages, and populated settlements on the east coast.

Continuously Implementing Widening Work

From 1984 to 1989 and from 1992 to 1995, the Directorate General of Highways held the first and second phase widening project for Huadong Highway. This project improved and widened the Beinan Township section (from Hualien City to Taitung County) to 12 meters in stages. However, to meet the east coast area development and tourism needs, the Hualien local government and various civil representatives have hoped that the government can widen the entire route to 30 meters to make driving more convenient.

In 2008, the Directorate General of Highways continued with the Provincial Highway 9 Huadong Highway Phase 3 Improvement Plan. For this plan, the Shoufeng urban plan to the Xikou power plant section (222K+400 - 228K+900) with heavier traffic was selected. The Xikou to Nanping section with poorer roads (228K+900~235+525) that cause higher accident risks, and the long bridge section (the approach road south of Wanli River to the northern approach road of Mataian River - 243K+600-246K+650) that is easily congested during weekends were chosen as priority for improvement. The project was planned to last from 2008 to 2012, and has now been completed. However, there are still sections of road within Hualien County that have not completed widening.

Traffic Improvement Comprehensive Road Network

There are still over 60 km of roads that have not been widened. The original plan included these roads into the Provincial Highway Improvement Plan. Since 2013, each road section's improvement has been included in the annual budget for road improvement based on the urgency of each road section. Considering that Provincial Highway 9 Huadong Highway is an important transportation lifeline for the Hualien/Taitung area, and that local representatives have pushed for improvement, the safety of this section should be improved as soon as possible.

In response to Hualien's public will, the Directorate General of Highways is using a special project method to drive the Provincial Highway 9 Huatung Highway Safe Landscape Boulevard Project. Approved and ordered by the Executive Yuan on October 18, 2016, planning, design, and construction of areas not included for widening (see Fig. 1) in the Provincial Highway Improvement Plan should be implemented in 2017 to speed up Provincial Highway 9's widening work. The schedule for this project is from 2017 to 2024. The total funding is approximately TWD 9.47 billion and the road improvement section is approximately 41.2 km.

The east coast area possesses a beautiful natural landscape and tourism has always been Hualien County's main economic development source. Provincial Highway 9 Huadong Highway is the main traffic artery of the east coast area and an important road for tourism development. In the past few years, multiple major traffic accidents have occurred on this road. Thus, the improvement objective of the Provincial Highway 9 Huatung Highway Safe Landscape Boulevard Project is foremost to reduce the probability of traffic accidents, and to take into account tourism development factors when implementing Provincial Highway 9 widening work.

Local Flavor Landscape Boulevard

In past road planning, design, and construction, landscaping has generally been positioned as beautification work after the traffic and civil engineering portion of the projects. However, this method de-emphasized the humanities, ecology, visual sequence, weight, and aesthetics of the facilities, environmental protection, and climate response of the overall corridor.

Different from previous improvement thinking with regard to highway widening, this project is based on the theme of human-centric safe landscape boulevard. Road landscape, traffic safety, and environmental protection were explored to determine the best integrated solution. The development characteristics and local characteristics of each road section is considered to create a safe landscape boulevard for the east coast area. This can also serve as a pioneering example for domestic road improvements.

It is expected that after this project is complete, the service quality of the bottleneck road sections will improve. The central divide and traffic lane allocation in the road improvement section will reduce accident probabilities while making dangerous road sections with poor visual fields safer. This improvement project will also integrate local development characteristics and surrounding landscape to turn Provincial Highway 9's landscape into a landscape boulevard with Hualien characteristics.

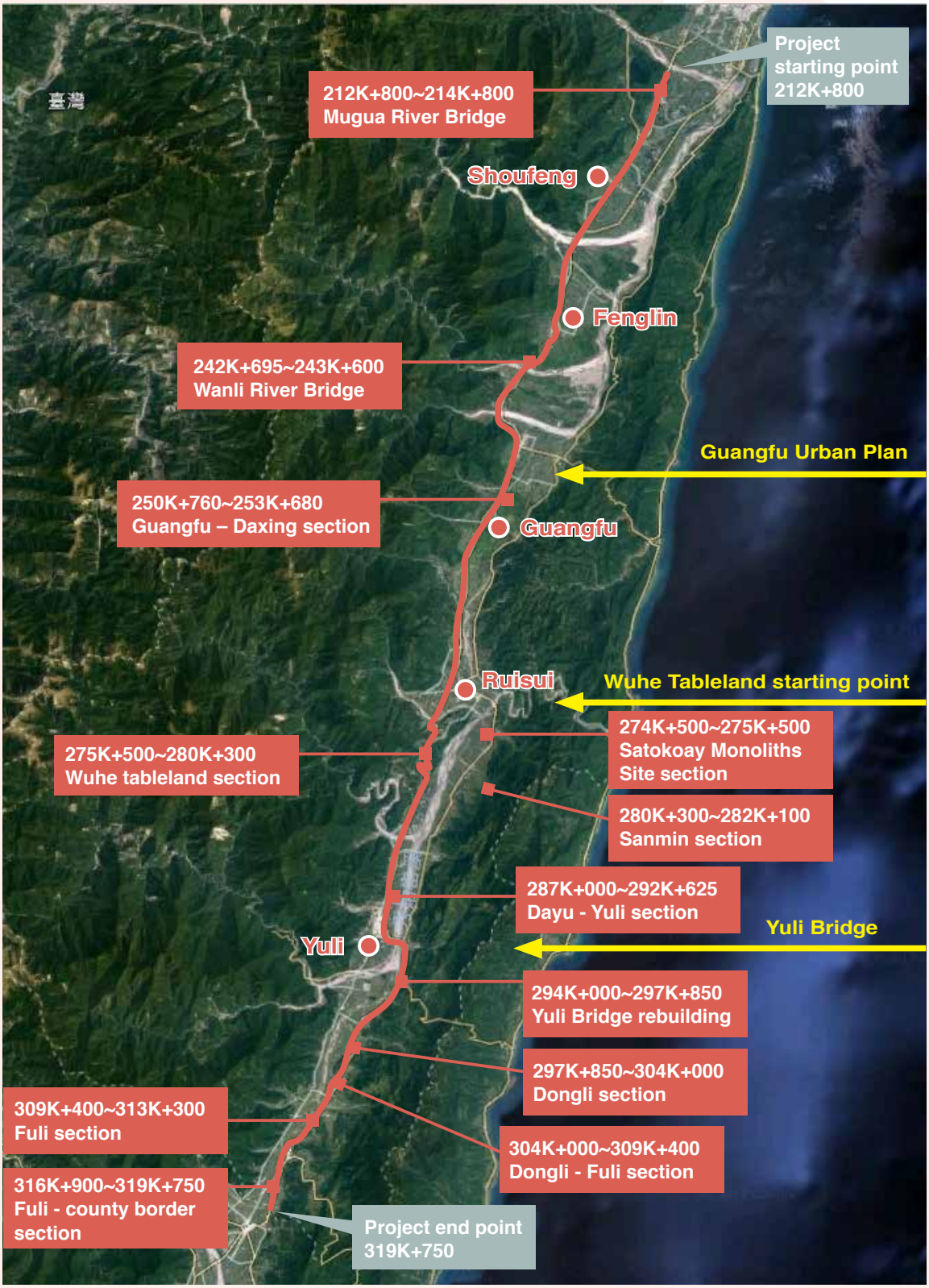


Illustration of the improvement scope in the Provincial Highway 9 Huatung Highway safe landscape boulevard project

Record of the Meinong Earthquake Bridge Restoration

We have always faced challenges from aging bridges, earthquakes, and floods. Of these three, earthquakes are the hardest to defend against because there is no warning. Earthquake disasters often occur in an instant and catch our construction units unprepared. This underscores the importance of immediate response. Luckily, annual disaster prevention drills and regular training have long improved the Directorate General of Highways' disaster response capabilities.

On February 6, 2016, a 6.6 magnitude earthquake (Richter scale) occurred in Kaohsiung City's Meinong district. The quake reached a strength of 7.0 at Expressway 86's Bridge 24, and severely damaged the bridge. Since the quake, the Fifth Maintenance Office and the Xinhua Branch worked day and night to restore the bridge including the initial road blockade and traffic control, the bridge's restoration design, subcontracting, and construction, allowing vehicles under 21 tons to pass, and completion of the bridge pier earthquake reinforcement construction.

Immediately Sealed Off and Established Detours for Severely Damaged Areas

The earthquake occurred on the first day of the Chinese New Year vacation, at 8 am. The Xinhua Branch immediately recalled all its colleagues and initiated a special disaster inspection. They discovered that Expressway 86's Bridge 24 was damaged. The bridge panel structure of the original east-west traffic lane divide had shifted outward from the central divide guard rail. Thus, the team immediately reported the incident and determined the damage scope according to the Directorate General of Highways' maintenance manual (Section 13.3). After an emergency survey, it was discovered that many bridge supports were damaged. Considering the safety of road users, the Directorate General of Highways' Fifth Maintenance Office immediately sealed off the east-bound lane that had shifted, and used emergency heavy duty supports for temporary reinforcement.

Tight Schedule for Simultaneous Implementation of Safety Inspection and Design

Because the schedule was tight, the safety inspection and restoration design was implemented simultaneously during the restoration reinforcement design stage. The objective was to confirm the bridge structure safety and return traffic to normal as soon as possible. Thus, the bridge structural safety inspection was commissioned to the National Center for Research on Earthquake Engineering (NCREE). While the safety inspections were being conducted, the restoration and earthquake reinforcement construction was commissioned to

Construction completed

Temporarily shoring up the support frame for moving the main bean into position

CECI Engineering Consultants (CECI). However, because this project was categorized as an emergency disaster project, the rule states that the design needed to be completed in 14 days. Because this earthquake was very strong, the bridge's upper box girder had clearly shifted and the bridge pier was damaged. After discussion, returning the top to its original position was chosen because it was the best method and would not require large-scale column expansion and had a short work period.

Load Testing to Confirm Usability

After the repositioning stage was complete, the box girder was returned to its position and the damaged disk support exchange work was completed on May 17. After the completion work, and before the bridge was put back into use, the NCREE was commissioned to conduct a vehicle load test to confirm the safety of the upper structure. This test was based on MOTC's 2014 edition Highway Reinforced Concrete Structure Bridge Test and Reinforcement Specifications (Section 5.2.2, Load Test Evaluation Method). The test was divided into a static and a dynamic load test. The obtained data was used to determine whether the box girder was usable. Furthermore, the bridge was monitored for a long period after it was put into use, and the results were a comfort to the engineering team. On May 20, the Fifth Maintenance Office announced that the bridge was open to vehicles under 21 tons as scheduled.

Accomplishing Our Task and Winning Recognition

As the disk support was replaced on Bridge 24 and the bridge was returned to position, it entered the final earthquake reinforcement construction stage. The bridge's earthquake resistance evaluation and reinforcement design were conducted according to the Directorate General of Highways' December 2009 Seismic Assessment and Retrofit Manual for Highway Bridges. It was determined that the bridge's insufficient earthquake resistance could be improved by using the system reinforcement method; thus, an anti-vibration block and steel plate reinforcement were used for the reinforcement work. The construction period was just when summer was heating up, and the infestation of Forcipomyia taiwana (Shiraki mosquito) made the work insufferable. However, the workers overcame these terrible conditions and worked day and night to complete the task as expected.

Bridge pier reinforcement construction

Earthquake damage restoration for Expressway **86's Bridge** 24 was completed on July 20th 2016.

The Expressway 86's Bridge 24 earthquake repair was completed on July 20, and opened to vehicles of all types. Looking back at the hard restoration work, the Directorate General of Highways, the Fifth Maintenance Office, and the Xinhua Branch were able to coordinate and complete the repair, restoration, and earthquake reinforcement goal. The efficiency and results demonstrated by this project were praised by superiors and external agencies, and serve as an example for other projects.

This project not only restored traffic south of the Zengwan Stream in Tainan City, but also boosted the Directorate General of Highways' confidence in the repair abilities of its workforce and gained recognition from road users. Bridge 24 was the first damaged bridge horizontal shifted and repaired project in Taiwan, and is the first bridge with a shifted non-rigid body. This valuable experience can serve as an important reference for future bridge disaster restoration.

Recognition of Excellence by Winning the Public Construction Golden Quality Award

To improve public construction quality and improve the living environment, the Executive Yuan's Public Construction Commission organized the Public Construction Golden Quality Award, which has been the highest honor for the domestic construction field. This year's competition was fierce, and had the most competitors in history.

Working Together and Producing Excellent Results

The West Coast Central Region Engineering Office organized the West Coast Expressway's Wanggong to Yongxing section (WH50 2nd Mark) project. Under the guidance of the Directorate General of Highways' officers, the construction team worked together without slack to win the "Excellence Award" category. On December 21, 2016, Deputy Director Chen Kuei-Fang of the West Coast Central Region Engineering Office and Branch Director Chen Yung-Chieh of the Sixth Branch accepted the award on behalf of the team. This award is a great recognition and encouragement to all personnel involved.

December 23, 2016 Director General Chen Yen-po (Seventh on the left) inspecting the WH50-2nd Mark work site

Bird-in-Flight Shape Landscape Landmark

The West Coast Expressway's Wanggong to Yongxing section (WH50 – 2nd Mark) is 3.3 km in length, and has a construction cost of TWD 2.143 billion. The project began on April 25, 2014, and is expected to be completed in September 2017. The original intention of the design was to highlight the local seascape using a method with the lowest environmental impact. The design focused on integrating local landscape, and the resulting bird-in-flight shape integrated an ecological imagery to form a landscape bridge with deep cultural connotations. When this bridge is open to traffic, it will interplay with the famous Wanggong lighthouse and the King's Bow Bridge to drive local economy and tourism development.

WH50 – 2nd Mark bird's eye view

No Longer Need to be Afraid of Waves

Completion of work at the site

Provincial Highway 9 has always been the main life support highway between the Hualien/Taitung and Kaohsiung/Pingtung area. If a natural disaster damages the highway and causes traffic interruption, not only will life and property be lost, but it will also have a significant impact on the local economic development and industry transportation.

Ocean Current Disaster Risks and Road Foundations

Beginning in 2011, the Provincial Highway 9 Taitung Nanxing Rd. section (438K+850-441K+300) has continued to experience road foundation subsidence. On August 24 of the same year, the Directorate General of Highways' Third Maintenance Office invited NCHU and NCKU expert scholars to conduct a survey. The experts deduced from years of coastline data and current situation that this is caused by ocean current erosion of this section after the Taitung County government built a sediment-blocking embankment on the north side of the Dawu Fish Port. Furthermore, in August 2012, Typhoon Tembin struck the area and caused road foundation erosion and subsidence in three sections of Nanxing Rd. This closed off the northbound outside lane. The Directorate General of Highways therefore approved disaster repair funding that year.

Shoreline Protection Response Measures

The design of the Provincial Highway 9 438K+850-438K+950, 439K+680-440K+080, and 440K+800-440K+900 Section Torrential Rain Disaster Repair Project was commissioned to CECI. A foundation erosion-prevention grill was used as a protective measure. Pilling's were placed along the outside of the existing earth retention wall. Filler layers and wave-breaking blocks were installed along the eroded shoreline as reinforcements. The total disaster repair length of the three road sections is 600 meters. The project began in September 2015, and was completed on September 13, 2016. After disaster repair was completed on the three sections of Nanxing Rd. on September 13, 2016, the area experienced Typhoon Megi and the northeast monsoon winds, and the erosion-prevention grill has shown to be effective. The road surface shifting sand (rock) decreased significantly and road safety increased significantly.

Suhua Highway Risk Control Upgrading

In recent years, high rainfall has occurred because of climate change, and heavy rainfall can still occur in the future. Thus, it is reasonable to expect that flooding-related challenges (including floods, landslides, and slope collapses, etc.) will become more severe in the future.

Introducing Risk Management in Response to Climate Change

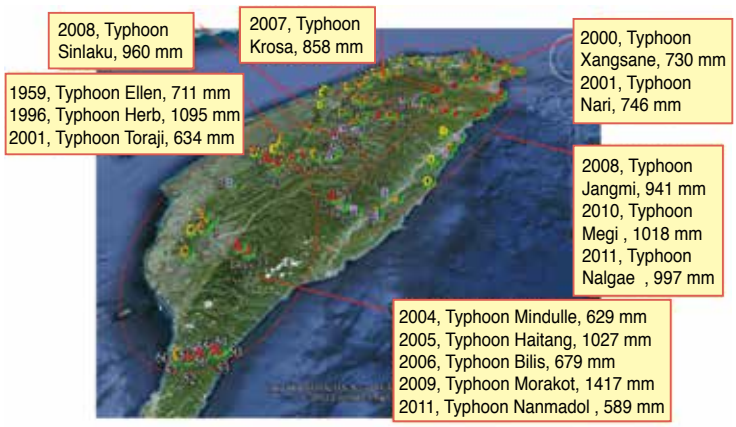
Thus, the Directorate General of Highways has continued to improve and examine highway disaster risks. By using historic disaster data, we are able to build a rain-induced collapse probability model, which can quantify immediate risk values and trigger disaster prevention management to lower disaster risks from heavy rainfall that do not have an early warning.

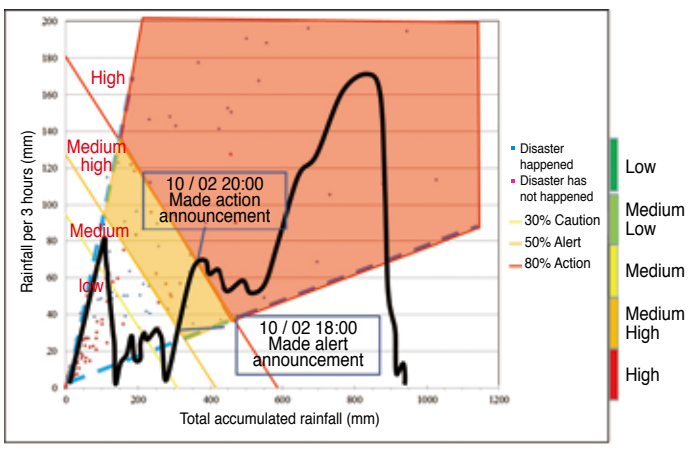
Suhua Highway is located on the east coast of Taiwan, and is the only linking highway between the east coast and the north. Because of disadvantageous natural conditions, numerous disasters have occurred on this highway. Thus, the Directorate General of Highways has especially selected this highway for the building of the collapse probability model, which can support valid, specific, and viable disaster prevention management decisions.

To objectively and rapidly determine highway risk levels, the Directorate General of Highways studied and analyzed highways risks. The main control strategy is to lower the probability of road users becoming victims of disasters. That is, to use traffic quantity as the exposure level. For example, comparing Suhua Highway's peak and off-peak traffic quantity. If a collapse happens on the same road section and in the same environment, then the probability of road users being involved in the disaster will clearly be different.

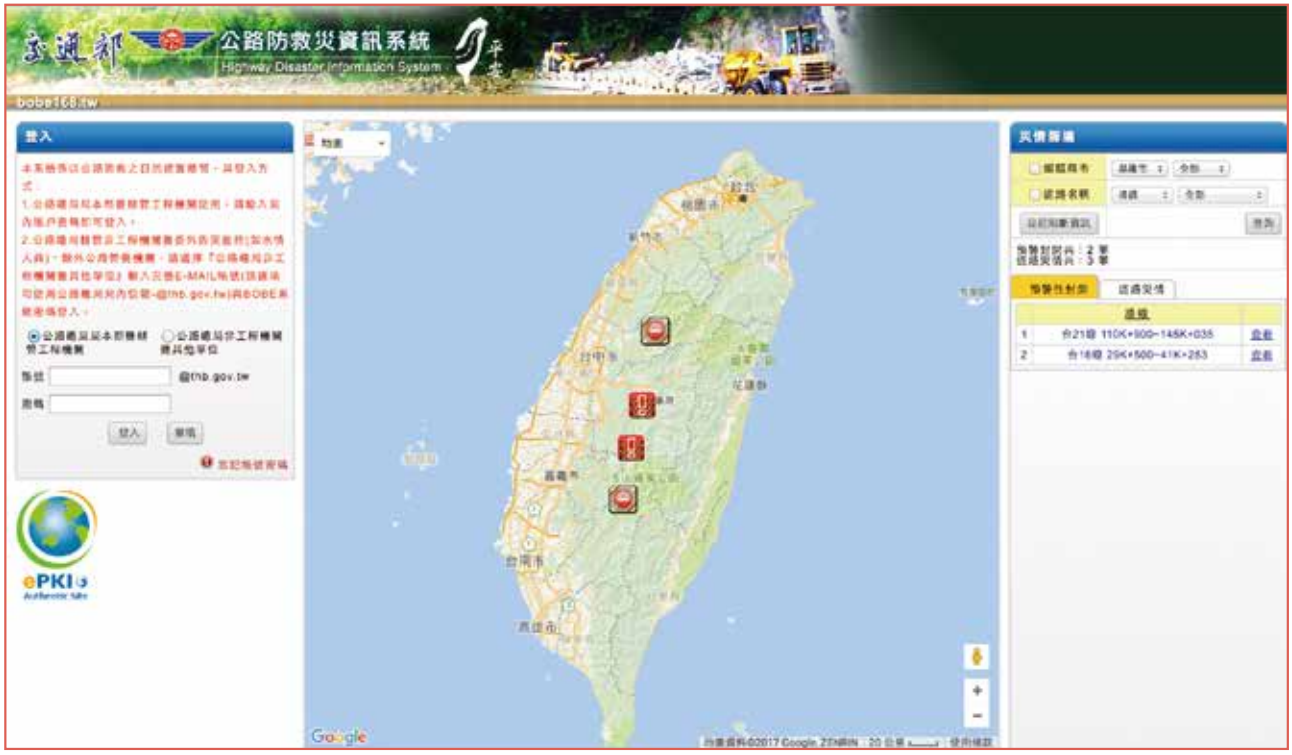
The Directorate General of Highways used the definition of risk as defined by the World Bank (as shown below). To calculate the immediate risk of various sections of the Suhua Highway, the actual control operation value from

Hazard level: frequency of disaster type torrential rain
Vulnerability level: collapse probability
Exposure level: traffic quantity





Example of the Suhua Highway collapse probability for the October 2011 Typhoon Nalgae rainfall



Highway Disaster Information System

road closures caused by historic severe weather was input This sets the risk value for when Suhua Highway should be closed off in severe weather.

Conducting Collapse Analysis Based on Historic Disaster Data

To establish risk values, we needed to collect and analyze historic disaster data. The overall analysis procedure was divided into rainfall category, historic disaster collection and categorization, vulnerability level analysis, exposure level analysis, and risk analysis. In addition to totaling the disasters, we used historic rainfall data and highway disaster comparisons for categorization. Statistical software SSPS was utilized to calculate the correlations between disaster and rainfall factors. Regression modeling was then employed to evaluate their collapse potential.

Suhua Highway is 76 km in length. To build a correct database, the Directorate General of Highway Disaster Prevention Center divided the entire highway into eight sections of 5-10 km each. Approximately 1327 disaster inspection report data points were collected over a 10-year period on Suhua Highway. Disaster categorization was conducted, and then the historic rainfall data points from five rainfall data stations that the Central Weather Bureau has set up along the route were compared. After deducting sporadic falling stone incidents that were not related to rainfall, collapse probability analysis was conducted. The design of the collapse probability model is continuously updated through statistical regression.

Disaster Prevention Early Warning Messages Immediate Disclosure and Announcement

Although using these methods can accurately estimate the risk value, people should still have the correct concepts. When there is severe weather, the disaster occurrence risk before reaching the road closing standard is the highest. Thus, when risk occurs, immediate delivery of traffic warnings regarding driving safety and disaster avoidance is also important.

It is because the delivery of early road closure warnings and disaster road closure messages, as well as the spread of these messages, is so important for decreasing the exposure level of road users that the Directorate General of Highways is setting the establishment of a disaster prevention early warning mechanism as its primary objective. In addition to using the existing LBSSMS broadcast service, EMIC established cell broadcasting service (CBS) was used to announce the early warning of road closures during Typhoon Nepartak. The scope of the announcement was from north of the Yilan County border and Hualien County's Shoufeng Village. At the same time, the system's smoothness and reception rate was tested. The system was found to have achieved highway disaster prevention early warning disclosure and can remind the public to ensure their life safety.

Natural Disaster Response Improvement in Early Warning System

2016 Real drill for disaster survey personnel entering disaster area

As global warming becomes more severe, disasters brought on by torrential typhoon rains will also become more severe. The Directorate General of Highways does not dare to be careless, and has made improvements in the early warning system, actual drills, and mastering disaster situation, etc. This is to reduce the effect of disasters when they occur.

Weather Monitoring Command Response

Thus, the Directorate General of Highways reexamined highway disaster risks in 2016. The agency used the 24hr automatic early warning system DPAWS for high risk roads for the first time, and also initiated the system before the flood season. All full watershed area management was matched with the Central Weather Bureau's QPESUMS system and the Soil and Water Conservation Bureau's set threshold value for sub-catchment areas. Data from these systems was used as a basis to implement disaster prevention early warning response for monitoring bridges. Discussions were conducted, and 63 level 1 and level 2 road monitoring sections, 19 bridge monitoring locations, and 16 places where highways are easily flooded or have flash floods were identified. The disaster level of high-risk highways and frequency during torrential typhoon rain was used to continuously adjust and revise multiple rainfall indexes such as the early warning, alarm, and mobility value. As of the end of 2016, a total of 11 editions were updated. The full watershed rainfall observation was revised nine times, all of which were published on the Directorate General of Highways' global information website, under the "Special Disaster Prevention Report" section.

In 2016 numerous torrential typhoon rains occurred and nearly 860 hours of flood monitoring was conducted. In total, roads were closed 111 times due to early warning for the typhoons Nepartak, Meranti, Malakas, and Megi. Early warning closure of roads because of disasters occurred 81 times. Because roads were closed due to early warning, no fatalities occurred on the road sections where the system was implemented.

Formulating Procedures Drill Preparation

In early 2016, each district's maintenance engineering office organized five drills under the 2016 Natural Disaster Command and Control Simulation and Drill Program. The command and control focused on emergency response team members and shift work of the command level supervisors, as well

2016 Real drill of initial high command work

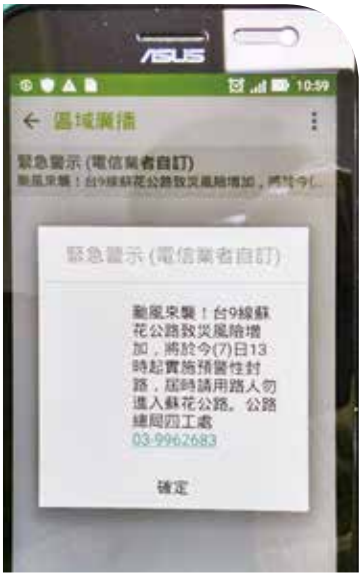
as command decisions and situational scenarios. The drills were conducted from 2011 to 2015 to improve weaknesses. In addition, the drills allowed base personnel to clearly understand disaster rescue actions, master disaster situations, and horizontal contact, and media response. The objective is to strengthen the command decision and implementation ability and increase the depth of disaster prevention and rescue response. The Third Maintenance Office and the Fourth District Maintenance Construction Office organized real life drills for the first time, and each drill included initial high command operations, forward command operations, and disaster area entry and operations by disaster survey personnel.

To smooth out response mechanism procedures during the flood control period, the construction offices under the Directorate General of Highways will complete 52 actual drills during the year's flood period. These drills will include simulated disaster response to natural disasters caused by typhoons, earthquakes, flooding, and tunnel disasters on the highways. These drills ensure that front line personnel are familiar with responses when implementing disaster prevention responses, improve the communication/reporting mechanism, and strengthen the Directorate General of Highways' highway disaster prevention early warning mechanism. In 2016, 12 training seminars were held for different training contents and subjects, and over 500 people attended. Various disaster prevention and rescue training subjects, relevant disaster prevention and rescue supervisors, and undertaking personnel were all required to attend.

The operation formulation part was completed in January 2016, and the MOTC Directorate General of Highways Prevention and Rescue SOP was approved for announcement and implementation. The revision of the aforementioned plan made the Directorate General of Highways' disaster prevention and rescue system and regulation more comprehensive, and allowed the agency to rapidly implement disaster prevention and rescue.

Disaster Prevention Early Warning Education Promotion

Because the time and scale of disaster occurrence cannot be predicted, and considering that early warning road closure and disaster road closure messages must be delivered rapidly to a wide audience, the current "Bobe" is set for 14 mountain area roads that are prone to disaster, including Provincial Highway No. 9 Suhua Highway, the south-loop highway, Provincial Highway 18 Alishan highway, and the Provincial Highway 21 new traverse highways. A total of 24 warning sections were planned according to disaster potential and magnitude of the disaster to provide "appropriate LBSSMS broadcast services for highways disaster prevention and rescue". In 2016, a total of 270,000 SMSs were sent. Police Broadcasting Service, LBS, CMS, television marquees, SMS, cell broadcasting service (CBS), and smart phone services were used to distribute highway disaster prevention early warning messages.



CBS/SMS received by 4G mobile phone

Furthermore, to achieve highway disaster prevention education objectives, the Directorate General of Highways collaborated with the relevant disaster prevention units in 2016 to organize the 2016 Geology Carnival – Running to Liji Badlands. The objective is to share thoughts on geology, combine industry, government, and academic participation, and to use promotions, publications, education and exhibition activities in coordination with disaster prevention, environmental protection, and landscape to give the public an understanding of east coast geology. This can promote geology, disaster prevention, and life knowledge to create socioeconomic and environmental preservation benefits. Each year, more than 300,000 people see the promotions, which is a great promotional result for disaster prevention.

Remarks
DPAWS (Disaster Prevention Auto Warning System)
QPESUMS
(Quantitative Precipitation Estimation and Segregation Using Multiple Sensor)
EMIC (Emergency Management Information Cloud)
LBS (Location Based Service)
CBS (Cell Broadcast Service)
CMS (Changeable Message Sign)
Bobe (Highway Disaster Information System)

Asphalt Tiles – The Nemesis of Potholes

When regular patching materials are used to patch potholes, the temperature and density cannot be effectively controlled. As a result, the potholes cannot be appropriately patched and are prone to moisture damage.

In-house Development and Proprietary Product

To effectively resolve problems of potholes and improve the durability of rehabilitation, the Materials Testing Laboratory (MTL) developed the asphalt tile and published the technical report in “Application of Asphalt Paved Surface Tiles on Roads” in December 2014. MTL applied two patents to the Intellectual Property Office of MOEA on April 30, 2014, and received one patent approval on the “Asphalt Tile Manufacturing Method” from the Intellectual Property Office on April 28, 2016.

Materials Consistency and Rapid Manufacturing

Asphalt tiles contain regular asphalt concrete which are capable of reflecting the original job mix formula and adjusting to in-situ service life of the designated roadways. In addition, the asphalt tile production process is simple and easy to control. Producing an asphalt tile only requires seven minutes. The advantages of utilizing asphalt tiles include: this tile can be installed rapidly with good quality, the materials are easy to manufacture, and learning curve to use is simple.

Standard Installation with Good Results

Furthermore, the asphalt tile on-site installation method is standardized and easy to learn. To validate the effectiveness, the Directorate General of Highways (DGH or previously known The Highways Bureau, THB) has regularly monitored 75 asphalt tiles. It was discovered that the tile height conformed very well to flatness requirements. The level differential was less than the specified value of ±6 mm. The flatness of the tiles is superior to regular patching materials, and can effectively improve the quality of rehabilitation, lower maintenance cost, and extend service life. MTI hopes to share benefits and knowledge of asphalt tiles and contribute to the maintenance and rehabilitation projects of roadways.

Manufacturing of asphalt tiles

Asphalt tiles

SafeTaiwan APP
Won the 100 Innovative I.T. Application Award

In 2010, the Directorate General of Highways had the Highway Disaster Prevention Center which belonged to Maintenance Division begin establishing Highway Disaster Prevention GIS Decision Support System and promoting disaster prevention with information to agency colleagues. The maps and real-time information for disaster prevention were provided by the Aerial Survey Office (Forest Bureau), Central Geological Survey, Central Weather Bureau, National Science and Technology Center for Disaster Reduction, Soil and Water Conservation Bureau, and Water Resource Agency without charge. At the time, the Executive Yuan's Central Disaster Prevention and Response Council gave administrative guidance and assistance. This was the forerunner of SafeTaiwan.

Cooperating with cross-field organizations and providing free open data

To trace the source of dealing highway disaster prevention and rescue issues, we also need to consider specific actions and effects at various stages of highway management and maintenance, highway construction, and highway planning in the beginning. We believe it can be beneficial to Engineering Lifecycle Management when relevant map data can be integrated. Thus, we set up the Guidelines for Spatial Information Map Data Management in 2011, and the Information Management Office is responsible for unified management of map data. In 2012, we designed an information architecture and made a service Proof of Concept (POC). Beginning from 2013, SafeTaiwan was built as a spatial information data warehouse and service platform over a span of three years. This project expanded cross-field cooperation among GOV, COM, ORG, EDU and people. In order to share safe and disaster prevention information direct to the public, to know, escape and leave from the disaster, we provide SafeTaiwan APP with subscribe, maps, crowdsourcing and LBS push service in 2016. Everyone can work together to control the overall disaster losses, and to realize the ideal of "70% self-help, 20% mutual-aid and 10% GOV-support".

The Directorate General of Highways funds the soft/hardware environment of this platform. Each contributors gives assistance based on the purpose of national interests, social welfare and citizen responsibility. For making SafeTaiwan interface instinctive and user-friendly, we followed four basic principles: "Open Data, Digital Convergence, E-governance, Simple", and divided map service into 6 categories: "Land, Water, Road, Bridge, Human and Disaster" in single platform. Currently, there are 16 government agencies (GOV), 4 private companies (COM), 4 organizations (ORG) and 4 academic units (EDU) participating and coordinating in this project to provide more than 600 kinds of map service.

Contributors

Push Service Management

Push Service

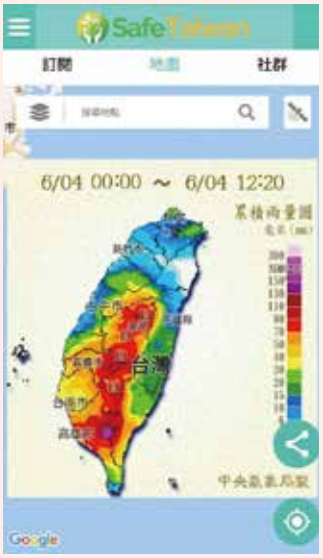
County/City Subscription

Subscription Event List

Water-Heavy Rain Prompt

Water-Radar Echo

Disaster-Flood Warning



Disaster-Early Warning Block

Disaster-Road Block

Disaster-Typhoon Prediction

Disaster-Typhoon Warning

Disaster-Earthquake Early Warning

Disaster-Earthquake and Human-Event Notification

SafeTaiwan APP-Android QR Code

SafeTaiwan APP-iOS QR Code

URL-QR Code

Multipurpose and Real-Time Alert

The ST-APP especially select 55 maps that are most relevant to the public from the aforementioned 600 kinds of map to provide a multipurpose service in single platform. No matter typhoon, flooding, earthquake, debris flow, road block, air quality or environmental radiation, people can access real-time information through [Subscribe] and [Map] function.

Furthermore, the system will notify users of typhoons and earthquakes automatically and comprehensively. Heavy rain and highways closed due to highway early warnings will notify based on user's location. This way of notify effectively increases the delivery speed and penetration of disaster warning messages. Users can use the [Crowdsourcing] function to broadcast disaster messages and to broadcast disaster messages to others and share safety status to Facebook friends.

With the ST-APP, various production agencies (organizations) no longer need to develop their own single-map service applications, and neither do users install other safety related applications. Which means that users' mobile devices will run faster and get information more convenient and various agencies can significantly reduce repeated development costs.

Awarded by the President for Outstanding Performance

ST-APP being one of the I.T. Innovative Elite 100 Winners in 2016 because of its idea and conduct. The method to integration of information from cross-field organizations is a successful example in government agencies. The initiator of SafeTaiwan, Director Chen Shou-Chiang, was awarded the 2016 Information Technology Month Outstanding I.T. Elite Award for his efforts. On December 3, 2016, President Tsai personally attended the award ceremony and bestowed the awards, a recognition of Director Chen and SafeTaiwan's outstanding performance in the information service field. In the future, ST-APP will continue making more effective use of system and provide high quality service for the purpose that help people to do their self-risk management.

Human-Event Notification

Note friend status

View reported events

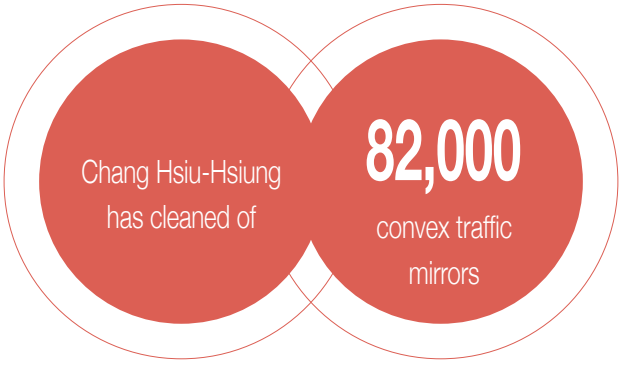
Demonstrating Glory at the Golden Road Award Ceremony

Director General Chen Yen-po (first on the right 1) handing over the Golden Road flag to the next organizer, the Bureau of High Speed Rail

Coordinated by the Department of Railways and Highways, MOTC, road related agencies take turns organizing the Golden Road Award every four years. This award is used to commend people who have shown excellent performance and achievements in highway, railroad, and metro management and construction.

2016 Golden Road Award Coordinated by the Directorate General of Highways

In 2016, the Directorate General of Highways was responsible for organizing the MOTC 2016 Golden Road Award. To ensure a smooth event, the Directorate held an early bid for the event and invited experienced vendors to host the event. Coincidentally, the new Director General was promoted to the position one month prior to the event. The newly promoted Director General Chen was previously in the National Provincial Highway Bureau, and the Bureau was the organizer of the previous Golden Road Award. Thus, the Director General had experience in organizing the award process and understood the activities of the awards ceremony.



It has been 17 years since the MOTC held the first Golden Road Award in 2000. Agencies that participated in this year's Golden Road Award competition included the Directorate General of Highways, National Provincial Highway Bureau, Taiwan Railways Administration, Taiwan High Speed Rail Corporation, and various county/city bridge maintenance and

MOTC giving the Director General a commemorative host plaque

MOTC Director General He Chen-Tan (third on the left) with the recipient of the special contribution award, Mr. Chang Hsiu-Hsiung (third on the right)

road maintenance units. On August 30, 2016, participating personnel gathered at the Taiwan Railways Administration's fifth floor auditorium for the MOTC 2016 Golden Road Award ceremony.

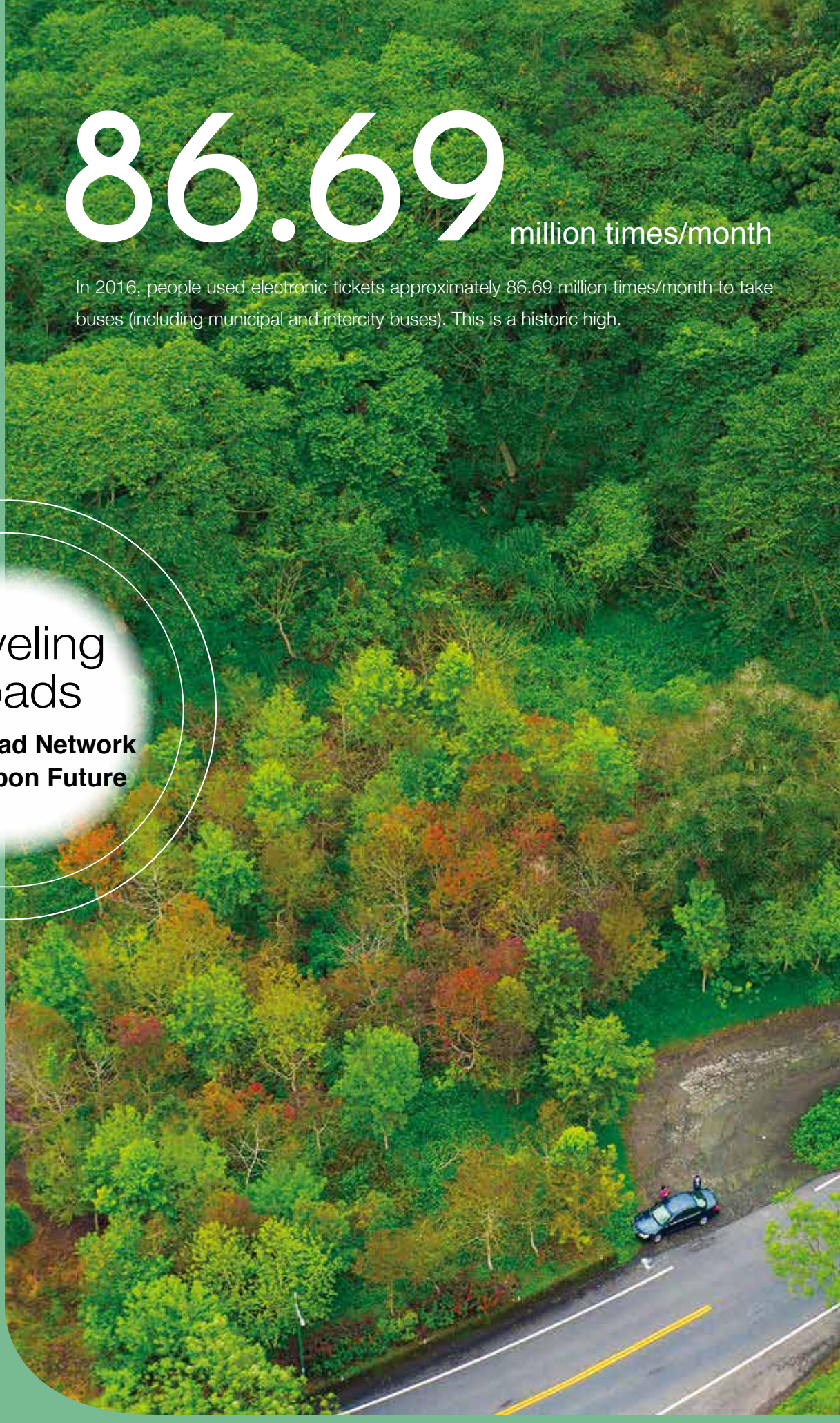
The Buddha of Convex Traffic Mirrors Special Contribution Award

The 2016 special contribution award was given to Mr. Chang Hsiu-Hsiung. Mr. Chang turned 75 this year. After witnessing a car accident after he retired, he vowed to clean up all the convex traffic mirrors on roads in Taiwan. Starting six years ago, he rode his motorcycle every day at 4 am and wiped clean convex traffic mirrors until noon. Mr. Chang has traveled across Taiwan to make sure that each convex traffic mirrors around street road corners is clean so road users can stay safe. He keeps a clear diary of his work progress and the routes that he is taking, and makes a cycle about every half year. Mr. Chang has even been in accidents and has broken his ribs during his work cleaning convex traffic mirrors. Still, he insists on doing his work without any reward. Because of his dedication, the media and road users have dubbed him "the Buddha of convex traffic mirrors". Chang Hsiu-Hsiung has cleaned over 82,000 convex traffic mirrors, and that number will continue to increase with time.

Giving It All You Got Perfect Ceremony

Although the Golden Road Award ceremony has successfully passed, we still remember all the hard work of all the units that participated in the event. Everyone gave selflessly and took on miscellaneous event activities, such as bidding organization by the Secretariat, arranging the award plaque engravings, special contribution award related work, venue decoration, and banquet arrangements. These items were all handled by designated personnel. The road maintenance team liaised with the units that have won awards and collected pictures to be made into ceremony pamphlets and commendation films. The Public Affairs Department was responsible for news announcements at press conferences and arranging media interviews for prize-winning units. The Civil Service Ethics Office was responsible for the ceremony venue and the safety of guests and participants. Each work had to be completed on time. To all colleagues, this opportunity to participate in competition against time was a worthwhile challenge.

Golden Road Award road user information category – Director General Chen Yen-po (The middle) and the representative of the recipient agency



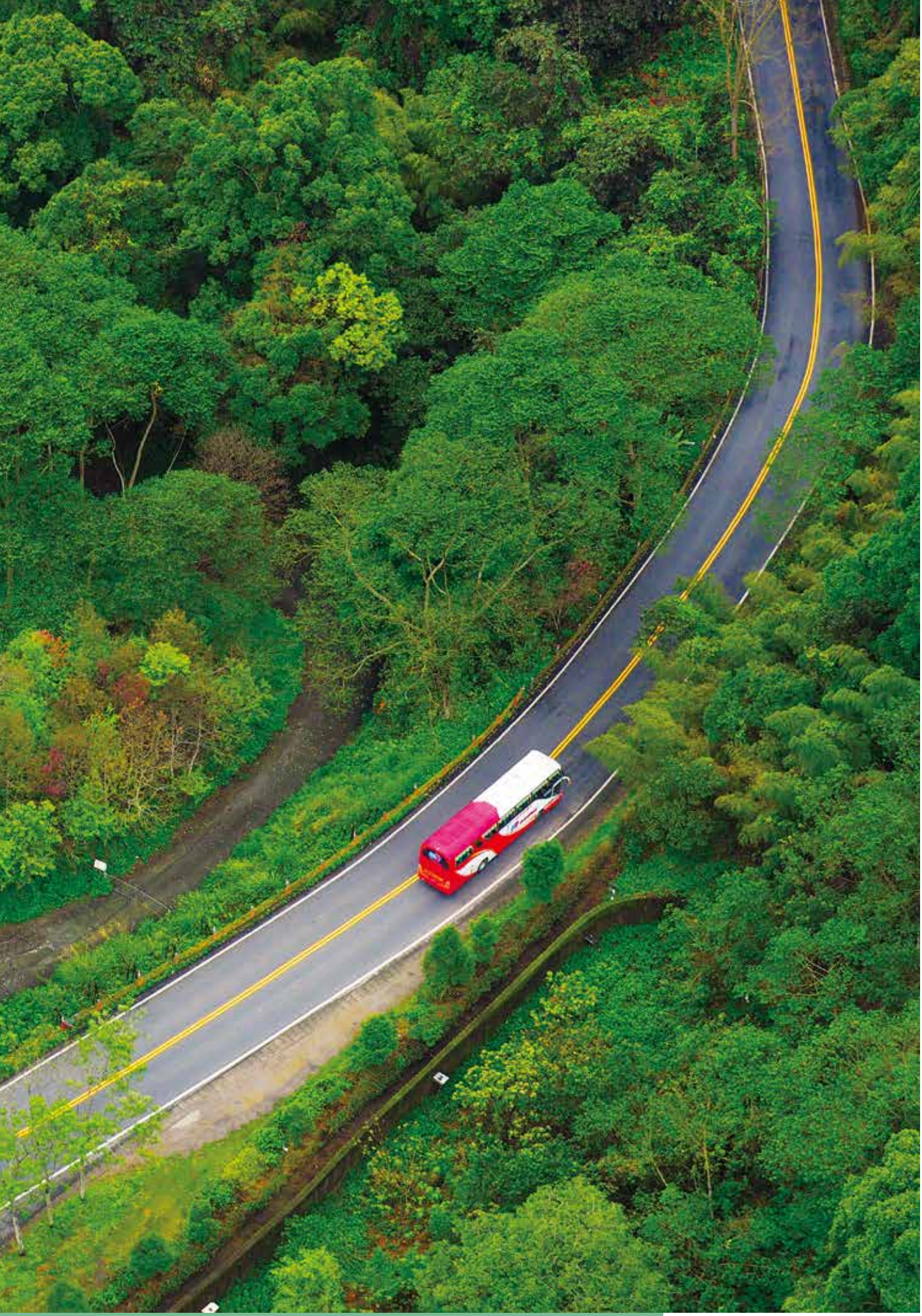
86.69 million times/month

In 2016, people used electronic tickets approximately 86.69 million times/month to take buses (including municipal and intercity buses). This is a historic high.

Traveling Roads

Green Road Network Low Carbon Future

We have always worked hard to improve public transportation service quality and reach inside Taiwan as part of our goal of building a convenient green transport system. Now, we are entering into schools, going deep into rural areas, and replacing the old with the new. Furthermore, we are improving our real-time bus information and service quality assessments so that the public can share their opinion and work together towards a low carbon future!



Improve the Nation's Public Transportation

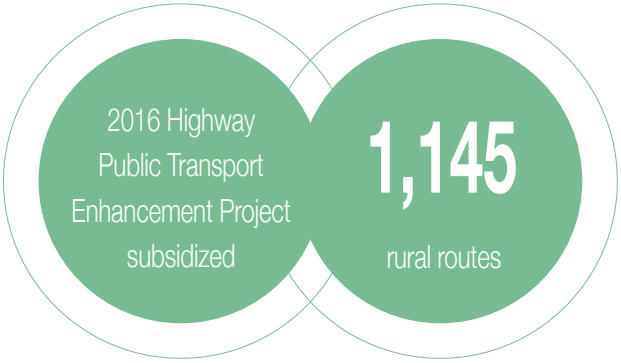
Subsidize the exchange and purchase of low-floor buses to provide barrier-free service

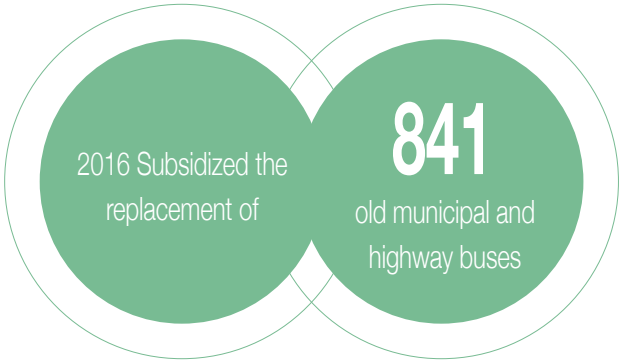
Since the MOTC initiated the Highways Public Transportation Development (2010 - 2012) in 2010, the public transportation market share increased from 13.4% in 2009 to 13.9% in 2010, 14.3% in 2011, and 15.0% in 2015. To extend the results of this plan, the MOTC is once again initiating the four year Public Highway Public Transport Enhancement Project (2013 - 2016).

The project is expected to improve the nation's public transportation service quality and reach based on market segregation, public preference, economic benefits, and various public transportation service advantages. Service integration and seamless transport is the project principle, and market sales concepts such as service, cost, seamless service, convenience, safety and other competitive advantageous will be integrated. This is expected to increase the public's use of public transportation and decrease reliance on private transportation.

Building Foundations and Pushing the Peak Improving Public Transportation

The year 2016 is the last year for the implementation of the Public highway transportation Improvement Project (2013 - 2016). The Directorate General of Highways





continued with the previous “building foundation” and “pushing the peak” public transportation promotion concept. For the “building foundation” part, the Directorate is continuing to improve the public transportation infrastructure and equipment, and maintain basic public transport services, subsidizing the local government’s organization of service to rural areas (subsidizing their losses), building multi-pass electronic ticket systems and bus movement information systems, building waiting stations, and speeding up exchange of old vehicles, etc. For “pushing the peak”, the strategy is to increase the public transportation passenger transport quantity and improve services, subsidize local governments in building large transfer stations, open new routes, provide barrier-free transportation services, and various marketing and shuttling plans. Awards for quantity performance will also be implemented. Planning for people, vehicles, routes as well as the rebuilding of stations, equipment, and systems will make the public transportation service more comprehensive so that the public will see our efforts.

Exchanging the Old with the New Building Multi-Card Service

Specific results of the 2016 Highways Public Transportation Improvement Plan include subsidization of 1,145 rural service routes, no reduction in maintaining basic public transport services, subsidizing the replacement of 841 old municipal and intercity buses (the average age of intercity and municipal buses have decreased to 5.6 years, which is a historic low), subsidize and exchange 499 low-floor buses (including barrier-free buses; in 2016 the nation’s municipal low floor ratio reached 50.2%, which is a historic high), and subsidizing bus operators in building more multi-pass ticket machine (including multiple machines in one vehicle; 2016 electronic ticket use for buses, including municipal and intercity buses, reached 86.69 million times/month, which is a historic high). As part of this subsidy plan, the Taiwan Railways Administration completed electronic ticket multi-pass service for all routes in Taiwan in June 2016. In September, the Taipei MRT and the Kaohsiung MRT achieved compatibility of their electronic ticket passes and systems.

In addition, bus entry into schools was initiated in 2016, as well as demand-responsive transit services, use of electronic ticket railway discounts for the Hualien/Taitung area, and plans to improve student use of electronic ticket travel discounts. These plans are expected to continue improving public transportation services, cultivate habitual use of public transportation, effectively improve road congestion, improve traffic safety, and promote energy conservation and carbon reduction.

Expand the promotion of electronic ticket multi-pass services

Buses for Rural Areas

The Directorate General of Highways greatly promoted the Demand Response Transport Service (DRTS) project in 2016 to improve public transportation service and convenience for rural areas. The objective is to promote the public's utilization of public transportation.

10 Counties Improving Transportation for Rural Residents

This project is primarily aimed at rural areas with less public transportation coverage. Initially, six cities and ten counties (excluding provincial cities and outlying islands) were selected for promoting this project. Thus, Yilan County's Zhuangwei Township, Hsinchu County's Jianshi Township, Miaoli County's Taian Township, Changhua County's Erlin, Nantou County's Renai Township and Hehuanshan, Yunlin County's Gukeng Township, Chiayi County's Alishan Township, Pingtung County's Chunri Township, Hualien County's Wanrong Township and Yuli Township, and Taitung County's Yanping Township were selected for the trial. In addition to priority promotion in the aforementioned counties/cities, other willing counties/cities are also encouraged to join the project.

The Institute of Transportation established six regional transportation centers to assist each local government in initial planning. Initial surveys were conducted to determine service requirements and find the gaps in existing local public transportation. This enables the planning of the most appropriate service models. After completion, the plans are given to each county/city government to submit to the Directorate General of Highways to apply for public transportation related funding and subsidies (to implement the plans).

Pingtung County's Chunri Township DRTS service began on December 28, 2016

Miaoli County's Taian Township DRTS initiation ceremony on December 15, 2016

Round Trip Shuttling Making Transportation More Convenient

Transportation began on August 24, 2016 for the trial area of Chiayi County's Alishan Township. Tour buses were used to shuttle residents who require medical service from the Chashan - Longmei area. Passengers transfer to intercity buses from Provincial Highway 18 to Chiayi City. Miaoli County's Taian Township began a bus service on December 15, 2016. Tourists who are going to the hot springs can take the high speed rail to the Miaoli HSR station, transfer to the high speed rail shuttle bus 101B to the Xueba National Park Wenshuei Visitor Center, and then take a medium size bus to famous scenic locations in Taian Township and enjoy the hot springs. This also satisfies the local residents' need for outward connecting public transportation. Pingtung County's Chunri Township began a bus service on December 28, 2016. This township does not have public transportation; thus, medium size buses and 9-seater shuttle buses are used to transport residents to the town hall, Fangliao Station, Fangliao Hospital, and Fangliao High School. This satisfies the residents' need for medical care, school, and work transportation needs.

Continuously Adding Bus Routes Building Sustainable Service

The Directorate General of Highways began 12 trial routes in 2016 to encourage local governments to plan DRTS public transportation services for rural areas. This trial can be used to guide local governments in promotion cooperation and fill the needs of people's basic transportation needs. Trials for other locations will begin one-by-one in 2017. We hope that this can effectively increase habitual use of public transportation in rural areas as well as building a local sustainable public transportation service model.

Information for 15 County/City Buses Information at a Touch of Your Finger

The Bus Movement System is an important item in providing seamless public transportation information. The Directorate General of Highways and the Six Capital special municipalities completed a comprehensive Bus Movement System (public service interface such as website and application) for the public's use earlier on. However, outside of the Six Capitals, most county/city Bus Movement System services were not as comprehensive.

Covering Bus Movement Information Across 15 Counties/cities

To help various counties/cities with the building and operation of a comprehensive Bus Movement System, the Directorate General of Highways began to guide county/city governments in 2015 to provide accurate and reliable bus movement information. The Directorate General of Highways included bus routes managed by county/city governments in the Highway Car and Bus Movement Information System so that people in different locations can conveniently access real-time bus information.

To improve convenience for the public when taking public highway transportation, the Directorate General of Highways' iBus_Highway Bus application provides real-time movement information for highway bus operators in Taiwan. Starting on January 1, 2016, nearly 50 municipal bus routes from 15 counties/cities (including Yilan County, Miaoli County, Changhua County, Yunlin County, Nantou County, Pingtung County, Taitung County, Hualien County, Chiayi County/city, Penghu County, Kinmen County, Lienchiang County, and Hsinchu County) were included in the system. This provides comprehensive intercity and municipal bus movement information across Taiwan, as well as ticket prices and bus schedules. The system makes it convenient for the public to take intercity public transportation for work, medical visits, school, and travel.

iBus_Highway Bus application Information with One-Touch

After the Directorate General of Highways' iBus_Highway Bus application integrated municipal bus route information from these 15 counties/cities, the scope and subjects of its services were expanded. As of December 31, 2016, over 905,805 people have downloaded the iBus_Highway Bus application. This shows that this application has become an important tool for people taking public highway transportation.

To further promote the use of public transportation, it is necessary to provide the public with county/city municipal bus information. After the iBus_Highway Bus application integrated the aforementioned county/city municipal bus information, the application has become more convenient to use. Users only need to download the application to be able to obtain intercity buses from across the country and municipal bus routes and schedules from 15 counties/cities. By making the Bus Movement System more comprehensive, the public is able to conveniently obtain real-time bus movement information, reduce waiting time, and reduce uncertainty in taking buses. This can increase the public's willingness to use public highway transportation and increase the utilization of public highway transportation, thereby achieving the sustainable transportation development objective.

Bus Transport to School Makes Going to School **Convenient**

Motorcycles have always been the preferred transportation for university students going to school. Currently, there are over 170 colleges and universities in Taiwan, many of which are located in rural areas that lack public transportation services. Students are forced to use motorcycles to get to school. However, many of these schools are in swerving or sloped mountain areas, which results in high accident rates.

Bus entering Shu-Te University

To decrease the motorcycle accident rate of university students, MOTC is actively encouraging central and local governments to initiate road safety and foundation building plans. In 2015, relevant units were invited to two meetings. Meeting resolutions authorized the trial of the university bus plan, which will be undertaken by the Directorate General of Highways. Other central government agencies and local governments will help with the plan. The Directorate General of Highways initiated this plan in March of 2015.

Convening Meetings Site Visits

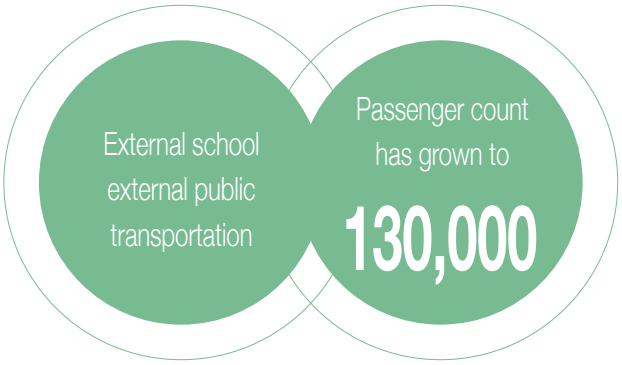
From April 2015 to November 2016, the Directorate General of Highways convened a total of 16 project meetings on school needs and current availability assessment. Relevant responsible units (Motor Vehicle Offices and county/city governments) assisted, proposed solutions, conducted surveys with operators and schools, and visited sites to understand the needs and possible challenges. In March and June in 2016, the Directorate General of Highways separately visited and conducted exchanges with schools, students, operators, and government representatives that are participating in the first and second phase of the project. Their opinions were fed back to the project committee. The Directorate General of Highways conducted follow-up coordination and assigned work.

Increase Use Decrease Accidents

As of December 2016, a total of 32 schools were included in the first phase of the plan. A total of 15 routes were adjusted and 7 new routes opened. This makes it convenient for the 15 schools to access outside public transportation links. In the second phase, a total of 17 routes were adjusted and one new route opened to give 15 schools more comprehensive outside public transportation. In addition, new routes are in the process of being opened to two more schools. Since the project's implementation, monthly passenger counts went from 40,000 to nearly 130,000. injuries and fatalities decreased from a monthly average of 1.11/thousand to 1.05/per thousand. The results have gained praise from various quarters.

Mutual Cooperation Continuous Promotion

This project hopes to use cooperation with the central government, local governments, bus operators, and schools to establish a more comprehensive and safe traffic environment. The objective is to cultivate students' public transportation use, have students move from private transportation to public transportation, and increase public transportation utilization. The third phase will be included in the 2017 - 2020 public highway transportation diversification and upgrade project to expand the service scope and benefit more people.



Implementing Tour Bus Evaluation for Peace of Mind

Improving the development of the tour bus industry is still an important item for the Directorate General of Highways. According to Article 86-1-6 of the Regulations for Vehicle Transportation Industry Management, "the tour bus industry shall establish regular management data and self-inspection checklists. Operators shall implement checks, and provide detailed data in cooperation with the competent highway authority's regular safety audits or evaluation". Specialized teams are regularly commissioned to conduct evaluations of the tour bus industry.

Across the Board Checks Implement Evaluations

This evaluation is for implementing the operators' self-management and improving service quality, to serve as indicators for the competent authority's management guidance, and provide reference indicators for people renting vehicles. Evaluation subjects include all tour bus operators in the nation. Complete on-site and document evaluations have been completed for 939 tour bus operators by December 31, 2015.

Three Major Aspects Excellent Selection

Evaluation items include vehicles, drivers, and company management. Of which, the vehicle management portion includes the vehicle maintenance system, overall vehicle performance, vehicle safety, and pre-driving safety check. The driver management portion includes work hour management, a driver rewards and punishment system, driver training, driver management system, and driver violations. The company management portion includes violations of highway regulations, use and management of onboard recorders, liability accidents, violations of road traffic management regulations, vehicle assignment forms, scale of the vehicle fleet, whether approved parking spaces are sufficient, accident processing mechanism, advanced vehicle fleet management equipment, passenger accident liability insurance, and complaint processing.

For this evaluation, 181 tour bus companies were rated as excellent. The Directorate General of Highways will continue to improve various driver, vehicle, road, and operator-related management measures. The tour bus evaluation system will be used to guide operators in establishing their brand image. The Directorate will also work with the industry to improve the domestic tour bus industry development and maintain tour bus safety. The public can search and read about all the operator evaluation results for this period on the [Directorate General of Highways supervision service website (www.mvdis.gov.tw) >> tour bus >> newest evaluation results].

On-site tour bus company evaluation

Fun Happy Highways Exhibition

Special exhibition —Danjiang Bridge International Design Competition Special Exhibit

The Directorate General of Highways (DGH) has been established for over six decades and plays an important role/position in Taiwan's public road projects and road supervision. The DGH coordinates the nation's highway construction, maintenance, road supervision, public highway transportation, and motor vehicle services. Its service subjects are people across the nation.

Happy Highways Exhibit Highways Culture Space

To improve our service performance and quality for the people, the DGH is planning a 460 m2 (1740 sq ft) Happy Highway Exhibition on the first floor of a new office building in Wanhua District. This will be a space for passing down highway culture and for exchange and innovation. The exhibition will be divided into a regular exhibit section, a special exhibit section, and a reading and leisure section. The regular exhibition section will exhibit this DGH's 70 years of highway development history, and has been open since August 3, 2015. To increase the public's understanding of the DGH' work, exhibits were held in the special exhibition and the reading and leisure section beginning in 2016. Appropriate exhibition topics were chosen and three exhibitions were held in 2016.

Danjiang Bridge Showing Competition Works

The first special exhibition was the Danjiang Bridge International Design Competition Special Exhibit, which was held from April 13 to May 13. The exhibition introduced the Danjiang Bridge Project, a major project of the DGH. The award winning international competition design and films, as well as the bridge model that won the competition, was moved to the special exhibition so that the public can better understand the design thinking and the engineering innovation of the award winning team.

Fun Interaction Getting Closer to the Public

The second special exhibition was held from July 4 to September 2 to match the summer vacation period. The targets of this special exhibition were elementary and junior high school students. The Road Supervision Treasure Hunt Activity was introduced to show drivers' licenses from earlier eras, special vehicle license plates, and physical examination equipment used for driver's tests. Fun exhibition content and interactive games were used to close the gap between the audience and road supervision work.

Special exhibition —Danjiang Bridge model

Special exhibition —Road Supervision Treasure Hunt special exhibit

Come and Take the Directorate General of Highways' Nostalgic Highway Tour

The third special exhibition was the Highway Bus 70th Anniversary Historical Artifact and File Special Exhibit. This exhibition was opened in coordination with this DGH's bus business 70th anniversary, and was held from September 26 to December 2. The exhibition was based around the phrase "come take the DGH Tour". The exhibition had a retro nostalgic setting that reconstructed imagery from earlier DGH' island traveling bus routes. The exhibit also displayed precious historical items and files, and introduced the history of the DGH, from the opening of right-of-way, handing over operations to private operations, and 70 years of highway bus transportation services.

Rich Content that Attracted Public Visitors

These three special exhibits attracted 2,557 participants, including 54 group reservations with tour guides. The Happy Highway Exhibit used the organization of special exhibition activities to enrich the exhibit content and attract visitors. More importantly, the exhibitions can continue to promote and record various DGH' businesses, and give the public a better understanding of the DGH.

Special exhibition —Highway Bus 70 Year Anniversary Historical Artifact and File Special Exhibit

Implementing Roads

Innovating Supervision and Improving Quality

In recent years, we have continuously pursued better road supervision service quality. In addition to completing an information service network, simplifying procedures, and integrating other supervision related work, we have also proposed reforms in car and motorcycle license tests to reduce accident rates and produce the most benefits for public service.

94.7%

In 2016, 94.7% of the public was satisfied with the overall service quality of the 30 Motor Vehicle Offices in seven jurisdictions under the Directorate General of Highways.


典禮

Implementation of the Car Driver's License
Road Test

Safety check –examinees must check around the vehicle, under the car, and the tires for abnormalities before driving.

Road test has been adapted as the way of driver license test by many countries. Taiwan currently adopts a field test (skill testing), while there still some drivers, who have been gotten their driver licenses, lack the confidence to drive on the road.

To improve the driver license testing system, the program of road test has been adapted to the field test(skill testing) of small vehicle. In addition to the simulated road environment in the static test site, the driver will be tested in actual dynamic road driving conditions. This can improve the beginner's learning of driving skills, improve their driving technique, cultivate correct driving habits, reduce traffic accidents, improve traffic safety, and shift to international standards.

Actual Road Test
Two-Stage Pilot Program of Road Test

Previously, the MOTC had approved the Vehicle Driver's Road Test Trial Plan proposed by the Directorate General of Highways. The Directorate General of Highways gradually introduced the small vehicle road test. Since December 2011, actual road tests for driver's licenses have been implemented in stages. The first stage trial was based on survey results of students who participated in the pilot program(s) of road test, which showed that participants supported the road test method. Beginning from March I, 2016, the second stage of the trial project was initiated. Applicants who apply for a driver's license test can choose

Road test –Cars must give way to pedestrians.

Get a driver license after passing the written and road tests.

to take a test field test, or a combined field test and road test. We encourage people to choose the second way to get DL, the pilot program of actual road test. Survey result of the trial showed that 90% of participants agreed with the implementation of road tests, and think road tests can effectively test driver's abilities and driving quality.

More Deducted Points More Safety

One moment of negligence and drivers can cause an accident and injuries/death. Thus, important deduction items in road tests must be added, including not checking for vehicles when getting out of the car, not wearing a seatbelt, not signaling, not turning and checking whether there are barriers on the left and right side of the car, and not checking for vehicles and pedestrians. These are all behaviors that influence driving safety, and correct behavior can realistically ensure that drivers have the correct safe driving habits. Thus, actual road test tests should increase point deductions for related violations.

As life and technology evolve, traffic density and complexity also increases. To promote the policy of reducing road traffic accident injuries and deaths, the Directorate General of Highways is working from the base up. Driver road test system reforms will promote the nation's road test system. Survey results from the previous two stages show that the majority of the public approves of road tests, and that the tests can guide and realize driver training, cultivate correct driving habits, and promote drivers to follow traffic rules, and reduce traffic accidents.

Director-General Chen, Yen-po (right) giving awards to commend driver school for participating proactively and cooperating in the pilot program of road test.

Promoting the New Motorcycle Road Test System

Previous light motorcycle driver's tests did not require a road test, and normal road test items were simple. To ensure that drivers cultivate good driving habits and behavior before obtaining their license, the Directorate General of Highways instituted the aforementioned adjustments to the motorcycle road test system.

Road Tests for Light Motorcycle License

To ensure the driving skills of light motorcycle drivers, and to conform to revisions to Article 65 of the Rules on Road Traffic Safety, omission of road test for light motorcycle driver's license will be nullified beginning from January 1, 2016. The light motorcycle driver's test will include a road test. Applicants must pass a written test and a road test (riding a light motorcycle) before receiving their light motorcycle license. Furthermore, road test items shall be added to light and heavy motorcycle tests, and test items shall be based on existing heavy motorcycle test items.

Reducing Accidents Adding New Test Items

Motorcycles are the main vehicle type involved in traffic accidents, and the main cause of accidents is neglect of the vehicle's status, not giving right of way according to rules, driving under the influence of alcohol, and not following traffic signals. Considering the use of motorcycles in Taiwan, motorcycle road use characteristics, and accident analysis, the Directorate General of Highways referenced driving tests from advanced nations and revised existing motorcycle road test items. In addition to existing straight line driving, crossroads, pedestrian crossings, railroads, road driving, and other operating skills, four new items (two-stage left turn, changing lanes, right angle turn, and stopping vehicle before starting) were added. The new test was officially implemented on June 1, 2016 to ensure that motorcycle drivers have the correct safety concepts and skills before they obtain their license.

Two-stage left turn

Changing lanes

Improving the Quality of Trainers

Road traffic safety is closely related to the driver's behavior, vehicle equipment status, and road environment. Among these, driver's skills and accurate behavior is the most important. This requires a comprehensive driver's training and strict testing.

Regular Training to Improve Trainer Quality

The concepts, professionalism, and teaching techniques of instructors often directly affect the learning of students. Thus, the Directorate General of Highways' Training Institute is holding regular training for driving instructors, traffic regulation instructors, and car structure instructors according to Article 22 of the Regulations Governing Automobile Driver Training School. This training is expected to improve instruction quality, help trainees effectively obtain the correct concepts, and improve road safety.

Different Needs Different Courses

Training course planning has both inclusiveness and variations. Coordination across various relevant units helps to master driving class needs. Different teacher professional requirements are used to plan different courses, which are divided into three categories (law, technical, and other) and 15 subjects.

For example, driving instructors especially emphasize Safe Driving Teaching Demonstration and Drill courses, car structure instructors focus on Power and Control Systems in Advanced Cars and other technical courses, while traffic regulation instructors concentrate on Accident Analysis and Handling in addition to basic traffic regulations. The objective is to provide students with sufficient traffic knowledge and allow them to understand how to clarify accident responsibilities and protect their own rights.

Two-Way Communication Update Teaching Materials

With the emergence of the Internet and IoT, the ways students learn have significantly changed. Students no longer accept traditional command-style training, and prefer two-way communication training. At the same time, today's social networks have a wealth of information, and obtaining information is easy. However, the amount of available information makes correct selection more difficult. To respond to these environmental changes, the Directorate is helping trainers and instructors improve their teaching abilities. Teaching Media Collection and Use and Communication Techniques and Teaching Methods are especially arranged in re-training courses so that teachers can grasp the newest information and updated teaching material. This enables instructors to adapt to the learning styles in a different era and improve students' learning results.

Increasing Threshold More Benefits

To improve instructor quality year by year and close the distance with advanced countries, the qualification threshold will be slightly adjusted every three years. This gradual method will be used to improve trainer and instructor quality. For example, 70 points is the qualifying score from 2015 to 2017, the qualifying score will be 75 points from 2018 to 2020, from 2021 to 2023 the qualifying score will be 80 points, and after 2024 the qualifying score will be 85 points.

Since this training was implemented in July 2015, a 5,892 people have been trained (as of December 2016). The ratio of people who did not pass was 3.0%. Thus, a small portion of instructors still have room for improvement in their professional field or skill set. However, after training, most people were able to achieve the expected results. As for course satisfaction level, the average student satisfaction level was 90.22 points in 2015 and 92.96 points in 2016.

Instructor retraining

Driver's License Management for Elderly Drivers

As the population in Taiwan ages and a higher proportion of drivers become elderly, physical aging and changes to body function can affect car and motorcycle driving safety.

Research Plan Getting Opinions

Out of care and from a preventive perspective, the Directorate General of Highways has engaged in research and discussion regarding a license management system for elderly drivers since 2013. For nearly three years research and planning has been conducted, and foreign offices from the Ministry of Foreign Affairs were also asked to collect license management regulation for elderly drivers from different countries. The Taiwan Society of Psychiatry was commissioned to study and plan a cognitive function test system and public hearings were conducted in December 2014 in Taipei, Taichung, Kaohsiung, and Hualien. In May 2015, relevant expert scholars were invited to a meeting, and from July – October, 2015, the National Development Council's Talk Platform was used to collect opinions from various fields and for administrative policy communication via the Internet.

Trial Advocacy Participation by Elders

The planning for the elderly driver's license management system is based on the premises of least impact on the public and drafting the most effective management proposal. Starting in May 2016, the Directorate General of Highways gave road supervision agencies the task of advocating voluntary elderly test participation when undertaking village supervision services. Since July, comprehensive trial advocacy was implemented. An elderly driver's license management system promotion team was convened to draft the details of the overall project planning and direction, operating procedures, regulation amendments, and related measures. The system is expected to be officially implemented in July 2017 at the earliest.

Test site for elderly drivers

Test site for elderly drivers

Car Inspection and Simultaneous Mileage Picture Record

Checking Mileage when Inspecting Cars

To protect consumer rights and ensure that the mileage is accurate, the Directorate General of Highways' supervision service website provides a vehicle mileage inquiry service. To coordinate with this service, the Taipei City Motor Vehicles Office especially developed the digital wireless mileage photography system. When vehicles are in for inspection, a mobile phone is used via the wireless photography system to take a picture of the mileage. The screen will show the vehicle's mileage, which will be recorded to ensure its accuracy. Car owners can use the supervision service application to check their mileage. Thus, consumers can avoid being scammed, and car dealers will be encouraged to disclose the vehicle's true status.

Taking **61,048** pictures has effectively improved the accuracy of mileage recording.

Dispute Evidence Improve Deficiencies

The current mileage wireless photography system not only can record a vehicle's mileage during inspection and provide evidence during disputes, but can also improve on human error of the previous manual key-in system. Users can use the supervision service app to check or inquire about their mileage. Taipei City Motor Vehicles Office and 19 commissioned inspection operators under the Shilin Station began testing on October 1, 2016 until the present. Thus far, 61,048 pictures have been taken and have realistically and effectively improved the accuracy of mileage recorded during car inspections.

Inspection personnel taking pictures

Confirming that the picture and registration match

Checking whether picture and registration match

Bus Safety and Insurance Inspection
Uploaded to the Cloud

This measure is to improve the driving safety management of operating buses, and to ensure that bus operators implement bus maintenance and repair work so that buses operate normally. This also extends the vehicle life cycle and ensures safety of road users.

Inspection personnel checking tire treads

Regular Inspections Check the Attached Maintenance Record

Vehicle technology is constantly evolving, and each bus manufacturer's maintenance cycle can be different because of such factors as oil grade, vehicle specification, transportation type, annual driving mileage, vehicle load, and driving behavior. Thus, the Directorate General of Highways has revised Article 39-1 and Annex 16 (operating bus maintenance records) of the Rules on Road Traffic Safety. Starting from September 1, 2016, when an operating bus goes in for maintenance according to the original manufacturer's maintenance cycle, and when an operating bus goes for mandatory regular inspections, the operator must inspect and attach the record form, and submit the form to inspectors from inspection agencies for audit purposes.

Cloud Upload Convenient for Inspection Audit

The maintenance record form gives an example of nine major maintenance items such as the engine and lubrication system, intake/exhaust and fuel system, steering and transmission system, brake system, electrical system, suspension system, wheel shaft system, air conditioning system, and electric drive system (specifically provided for electric bus maintenance). The vehicle repair operator shall conduct factory maintenance items and cycle-specific maintenance (including inspection) before signing off. When processing vehicle regular inspections, the record form shall be given to the inspectors from the inspection agency for audit purposes, and to achieve the objective of operating bus maintenance and inspection in one.

In addition, the Directorate General of Highways' road inspection and audit personnel shall audit the record. Once the operating bus passes inspection by the inspection unit, the operator must upload the record to the road supervision system (M3 system) for easy access by the road inspection and audit personnel for audit purposes. This can prevent bus operators from being fined for not carrying maintenance records for buses that are over 10 years old, simplify procedures, and achieve digitization objectives.

Inspection personnel confirming that safety doors can be opened by hand from the inside and outside

Controlling the Transportation of Hazardous Items at the Source

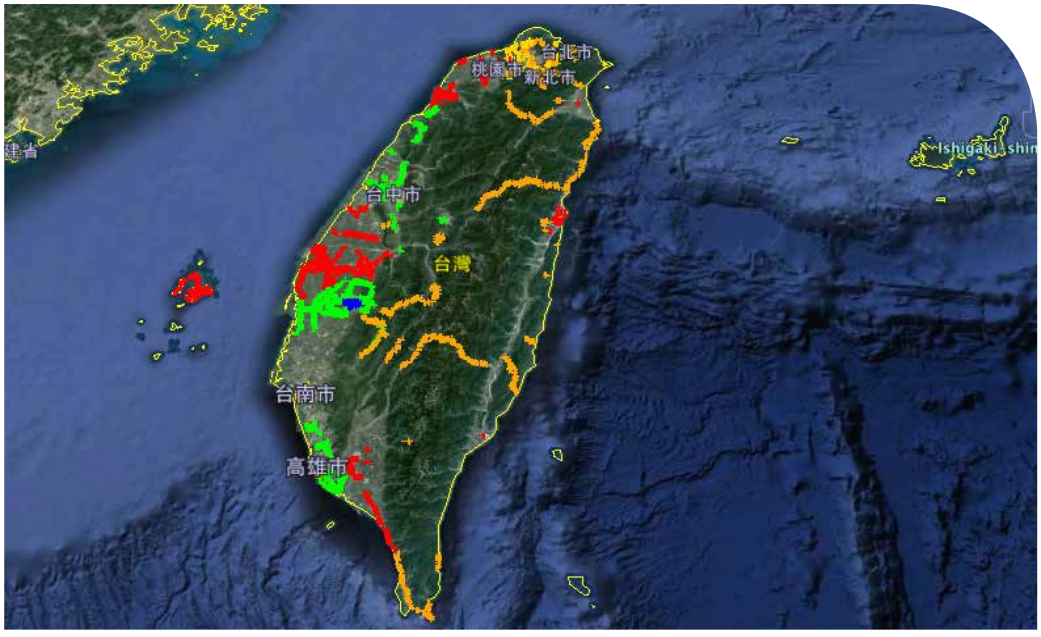
To improve hazardous materials transportation safety management, the Directorate General of Highways began promoting various improvement measures from June 2015. The existing management system was reviewed from an implementation and legal aspect, including the interfaces with the competent authorities of various industries so that the source of hazardous materials transportation can be included in audits.

Severely Punish Violations

The Directorate has asked police agencies to increase inspections of locations where hazardous materials vehicles are prone to become involved in accidents, and to fine drivers who violate regulations in the agencies' respective jurisdictions. Supporting measures were revised and the inspection cycle of high-pressure tankers over 10 years old was changed to three times a year. In addition, fines for not having applied for a temporary pass, transport personnel not having qualified training, not driving on regulated routes during regulated times, speeding, running red lights, or behavior that directly or indirectly affects hazardous materials transportation safety were increased to a maximum of TWD 9,000.

Establishing Map Data as a Source of Reference

To jointly maintain hazardous material transportation safety and risk control with various competent road authorities, the Directorate General of Highways has coordinated with various competent road authorities to conduct an overall review, and to announce routes and time periods for transportation of hazardous material vehicles in their respective jurisdictions. A "Hazardous Material Vehicle Limited, Prohibited, or Recommended Driving Route" has been set up in the Directorate General of Highways' website. The recommended and prohibited routes and times for hazardous material vehicles announced by 20 county/city governments and various offices under the Directorate General of Highways is shown in map data so that transportation operators have a basis for planning their transportation route. This also serves as a basis for various road supervision agencies to review and issue temporary passes.



Setting up a Hazardous Material Vehicle Limited, Prohibited, or Recommended Driving Route section on the Directorate General of Highways' website.

Very Satisfied with Motor Vehicle Service Quality

Experience the Motor Vehicle Office self-help counter

To improve service to the public and increase the public's satisfaction towards motor vehicle offices, various motor vehicle offices have added different and more comprehensive public services. From August 22 - September 10, 2016, the Directorate General of Highways commissioned a private marketing research company to conduct a motor vehicle service quality satisfaction telephone survey. 2,521 people were successfully interviewed by phone.

Of the **18** motor vehicle service items, 8 items had a satisfaction level over 90%

Two Satisfaction Evaluations Reached New Heights

The 2016 Public's Satisfaction Survey Towards the Service Quality of Directorate General of Highways' Motor Vehicles Offices (Stations) results showed that 94.7% of the public was satisfied with the overall service quality of 7 Motor Vehicle Offices and 30 Motor Vehicle Stations under the Directorate General of Highways. The average evaluation score was 85.5 points, which was a dual historic high record.

Safety advocacy starts small

Comprehensive Service is Greatly Recognized

Of the 18 items in the motor vehicle service survey (6 items on solicitation environment facilities, 7 items on personnel service attitude and professionalism, and 5 items on public service facility and policy promotion overall satisfaction level), 8 items had satisfaction over 90%. Of these 8 items, the satisfaction for "convenience of various service facilities" and "service center/counter volunteer and patrol personnel service attitude" reached 96%, which is a historic high for a single item. This indicates that the public recognize the Directorate General of Highways' various motor vehicle measures. In addition, "counter personnel service attitude", "counter personnel service professionalism", and "service center/desk volunteer and patrol personnel service attitude" all received high scores for importance and satisfaction. These items are an advantageous factor in the overall evaluation.

Continue to collect public response

Improvement Recommendations Keep Working Hard

The public also provided many improvement suggestions in this survey. Of which, "open for business on weekends" was the most common, followed by "improve the speed of service procedures", "add service counter or personnel", and "insufficient parking". The Directorate General of Highways will study various response measures, actively respond to public needs, and plan better and more convenient motor vehicle services.

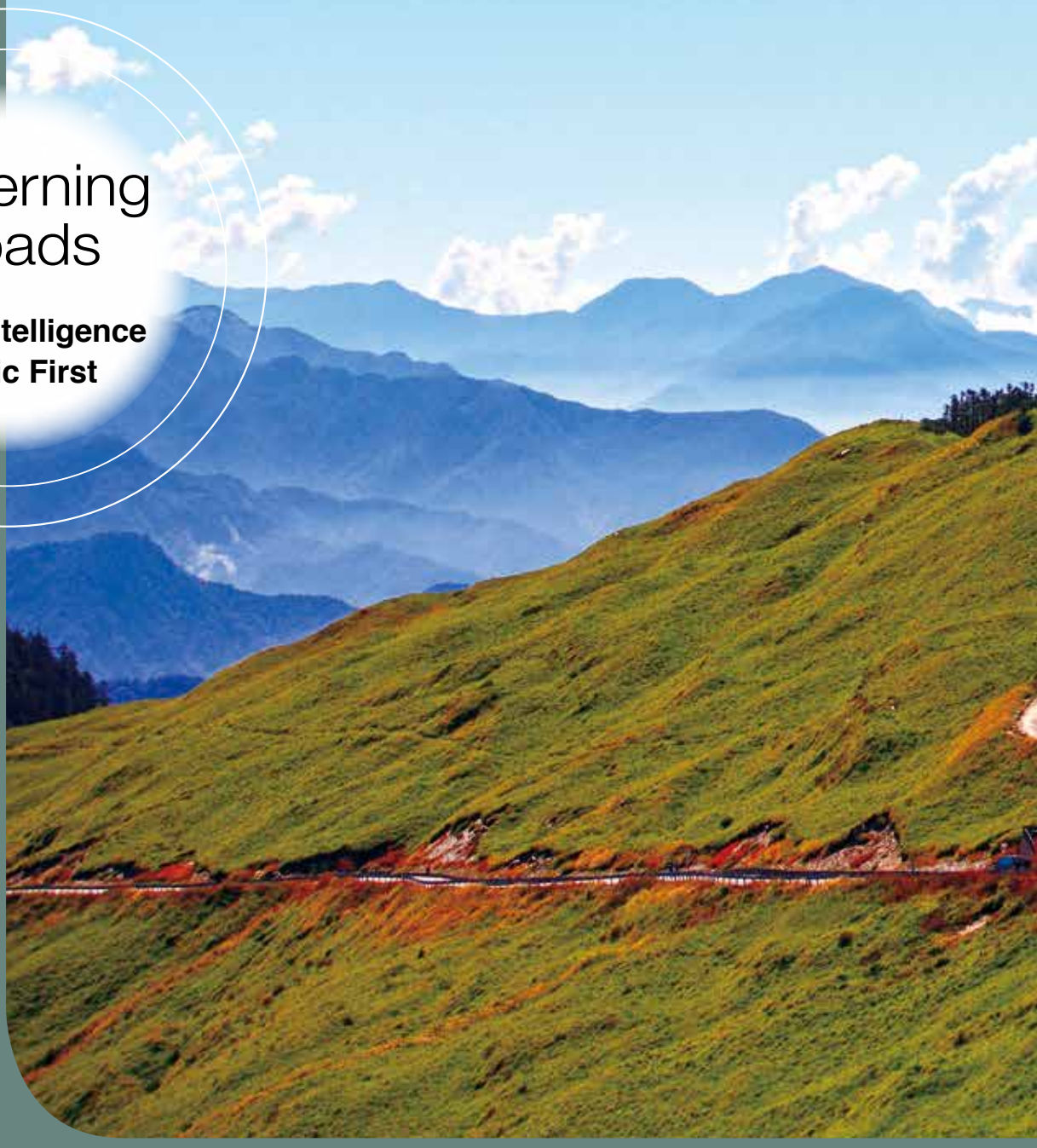
27.12 million driver's licenses issued

The Third-Generation Motor Vehicle and Driver Information System uses efficient cloud technology to manage 27.12 million driver's licenses and 21.31 million cars and motorcycles.

Governing Roads

Cloud Intelligence
Public First

Since the beginning, the Directorate has been determined to implement sustainable development. Everything was based on road users first. The 24/7 road user hotline and the Third-Generation Motor Vehicle and Driver Information System are continuously improved. At the same time, the Directorate has fulfilled its public duties. We began with vehicle inspection operators for our guidance implementation, and hope that our work receives more recognition from the public.



Third-Generation Motor Vehicle and Driver Information System Recognized with Awards

The Directorate's Deputy Director General Huang Yun-Kuei (third on right) receiving the Award of Project on behalf of this agency

To improve motor vehicle management and supervision, administrative efficiency, and public service, the MOTC commissioned the predecessor of Chunghwa Telecom's subsidiary Data Communication Branch (MOTC Data Communication Department) to plan, design, and develop the First-Generation Motor Vehicle and Driver Information System (M1) and start the computerization of motor vehicle in October 1981. Later, in response to its growing motor vehicle work and scope, and using M1 as a basis and combining it with existing information technology at the time, the Second-Generation Motor Vehicle and Driver Information System (M2) was born. However, as M2 became older, the motor vehicle workload grew heavier, and new business and service quantity increased, a new information platform was urgently needed to take on future business and service needs.

Value Innovation Service First

Thus, the Directorate General of Highways initiated the Third-Generation Motor Vehicle and Driver Information System (M3) Outsourcing Service Project in 2011 to develop a new-generation service oriented Motor Vehicle and Driver Information System to satisfy public needs. This system not only increased overall system efficacy and flexibility, but also simplified application procedures for the public. The system also provides a one-stop service and multiple innovative services to achieve the motor vehicle objectives of "system transformation, sustainable management, improved information security and personal information protection, diverse channels and full service, bridging the gap between cities and countryside, and caring for disadvantaged groups".

The Directorate's Director General Chen Shou-Chiang (left) receiving the Award of Manager

Cloud Technology Stabilize Finances

With the hard work of the M3 development team, the system started real scenario testing on July 7, 2014, and officially launched on May 6, 2015. M3 uses cloud technology to effectively manage 21.31 million cars and motorcycles and 27.12 million driver's licenses. Not only that, M3 brought TWD 110 billion in stable income to the national treasury each year (including fuel tax and license tax) to fund the nation's highways and bridge building, management, maintenance, and repair. In addition, M3 provides linking service to 36 outside administrative agencies, including key national services such as "finance, police, and national freeway meter tolls".

Protect Personal Information Intelligent Uses

Because M3 contains all the nation's motor vehicle data, and to ensure the implementation of various motor vehicle services comply with the Personal Information Protection Act, national standards, and the National Information & Communication Security Taskforce's (Executive Yuan) "Government Agency (Organization) Information Security Responsibility Classification Regulations", the Directorate General of Highways began introducing the PIMS, ISMS, and ITSM management systems in accordance to international standards in 2014. Based on personal information protection and information security, M3 developed more diversified intelligent services such as app, self-help information kiosk and roadside inspection.

Outstanding Performance Dual Awards

For successfully developing M3 and transforming M2 to M3 with uninterrupted public services, and providing a successful example of a government agency information system building project, the Directorate won the 2016 ITeS Award (Superior Technology Service Management Project by a Public Department) awarded by itSMF Taiwan. Director General Chen Shou-Chiang won the 2016 ITeS Award (Outstanding Technology Service Manager) by itSMF Taiwan. This is a commendation for both M3 and for Director General Chen regarding outstanding performance in technology information service management. In the future, M3 will continue to be optimized to improve service quality and availability, and to provide more superior quality services. We hope that this satisfies the public's need for motor vehicle service.

Photo of the award ceremony

Realizing the Integrity and Honesty of Outsourced Inspections

The Directorate General of Highways is responsible for road supervision, vehicle inspection, and items related to safe driving by the public. To implement supervision service in ways convenient for the public, the Directorate has commissioned private vehicle inspection operators to implement vehicle inspections. Thus, vehicle inspection operators are work partners that the Directorate General of Highways cannot do without.

Witnessing of the declaration

Counseling Inspection Operators Fulfill Their Duties

To counsel operators on their sustainable development responsibilities and obligations, the Directorate has included counseling work for vehicle inspection operators beginning in 2014. For example, the Directorate organized integrity seminars and large vehicle inspection audits for outsourced vehicle inspection operators in 2014. In 2015, the Integrity Related Regulations and Notification for Commissioned Vehicle Outsourced Inspection Vendors and Personnel were included in the outsource contract. In 2016, the Vehicle Inspector Ethics Guide was printed and issued, and an awareness-raising project was implemented. A vehicle inspection business audit were conducted in 2016 and the results received recognition.

Honesty and Integrity Opinion Exchange

In response to International Anti-Corruption Day on December 9 each year, and to show our determination to fulfill our public duties and achieve sustainable development to the public, the Directorate General of Highways specially organized a forum with the Taiwan Car Examination Association. The content of the forum is based on “honesty, integrity, and social responsibility”. The forum was held on November 18, 2016, at the Southern Region Training Center, Training Institute, Directorate General of Highways, M.O.T.C. The results were shared with southern area vehicle inspection operators. 201 people from the MOTC, Agency Against Corruption, Ministry of Justice, Transparency International Chinese Taipei, Labor Affairs Bureau of Tainan City Government, Motor Vehicle Offices from southern Taiwan, and vehicle inspection operators participated and engaged in opinion exchange regarding various inspection topics. Four proposals were also passed.

Mutual Signing and Witnessing the Announcement

Furthermore, to strengthen the determination of operators in building a culture with integrity, the Directorate has insisted on honesty and integrity, and social responsibility. The southern region Taiwan Car Examination Association president was invited to sign a declaration, witnessed by representatives from the MOTC, Directorate General of Highways, Agency Against Corruption, Ministry of Justice, Transparency International - Taiwan, Taiwan Car Examination Association, and Tainan City Government Labor Affairs Bureau. The signing and witnessing of the declaration is expected to help outsourced inspection operators manage with integrity, fulfill their social responsibilities, and mutually improve road supervision service quality.

Signing representative from outsourced inspection operators taking photos with witnesses

Establishing a New Vehicle Inspection Culture

July 12, 2016, Chiayi Motor Vehicle Office and outsourced inspections operator forum in its jurisdiction

Vehicle Inspector Ethics Guide

In 2014, the Directorate General of Highways issued its first sustainable development report. This opportunity was used to show the public the Directorate's determination to continue fulfilling our public duties, pursue sustainable development, and share our sustainable development results, which have been recognized by many.

Using Examples and Emphasizing Core Values

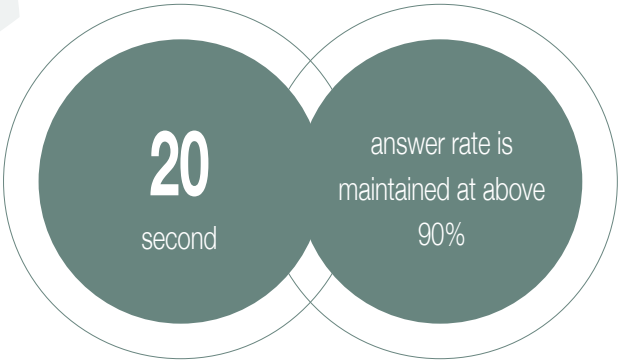
In view of this, and considering that vehicle inspection operators are the hardest working partners of the Directorate General of Highways, we will do our utmost to fulfill our counseling obligations and care about the sustainable management of the vehicle inspection operators. Therefore, the Directorate has published the Vehicle Inspector Ethics Guide to emphasize the inspection personnel's four core values (integrity, professionalism, responsibility, and fairness). Examples of violations from the past three years were collected in administrative, civil, and criminal fields to clarify law related judgments. The objective is to help inspection personnel understand the importance of correct inspections from an ethical and legal perspective. Furthermore, outsourced inspection operators are included in corporate integrity and social responsibility. We hope that this can integrate integrity and ethics into strategy management and fulfill social responsibilities. By issuing this guide, the Directorate hopes to build a new vehicle inspection culture with private outsourced inspection operators, so that we can all do our best for public road safety.

Issuing Nationwide for Active and Expanded Promotions

After the Vehicle Inspector Ethics Guide was printed in April 2016, it was sent to Motor Vehicles Offices and respective outsourced inspection operators under their jurisdiction nationwide. To expand the impact of the guides, the Directorate General of Highways also placed an awareness raising plan in this ethics guide based on the education of vehicle inspection personnel, on-the-job training, and outsourced inspection operator responsible persons in May 2016. The plan is to be promoted and implemented by the Motor Vehicles Offices in different areas. In June 2016, an article was printed in the Taiwanese Highways and Legal Communication. In August 2016, the content of the ethics guide was summarized and printed in the Vehicle Inspector Ethics Guide and issued to vehicle inspectors across the nation. This is in the hopes of reminding base personnel when they are conducting inspection work, and provide a guidance function to improve road supervision service quality.

Anytime On Call Received Outstanding Evaluation

20 second answer rate is maintained at above 90%



On June 8, 2015, the Directorate General of Highways officially started the Highway User Service Hotline (0800-231-035). On average, the hotline receives 22,000 calls per month from the public seeking help. This is equivalent to about 1000 calls per day. The hotline has become a good communication bridge between the public and the Directorate General of Highways.

One Telephone Number for All Your Questions

The Highway User Service Hotline integrated the Directorate General of Highways' original Supervision and Bus Service Hotline and the Provincial Highway Road Condition and Disaster Survey Hotline. The public only has to remember one telephone number to obtain the answer to any questions related to the Directorate General of Highways' business scope. Users can also use this hotline to make inquiries, report matters, or submit requests. The hotline operates all year round and users can call any time without charge. Now, communicating with the Directorate General of Highways is more convenient than ever.

To further improve service efficiency, the Directorate General of Highways has a telephone traffic management center. Not only does the Directorate have a complete and professional system, we also have excellently trained telephone service personnel. The goal is to answer most of the public's questions with one call. This can increase public service efficiency and reduce customer service's telephone incoming call load.

According to the Highway User Service Hotline system's service data, the issue resolution rate within one call is over 90%. This outstanding result shows that the call service system's database and the training of service personnel is sound and comprehensive. Furthermore, the monthly call answer rate and answer within 20 seconds was maintained at above 90%. This indicates that the public does not need to wait for too long for services when calling. Convenience and fast response is the key to winning the public's trust for this hotline.

Satisfaction Level Survey Received Wide Recognition

Since the initiation of the Highway User Service Hotline, automatic callback has been used each month to survey the public's satisfaction level towards this hotline. The survey results show that the satisfaction level (including personnel service attitude, answers to questions, or overall service) was above 87%. This indicates that the Directorate General of Highways' Highway User Service Hotline has received wide acceptance by the public.

During the more than one year that the Highway User Service Hotline has been operational, initial results have been impressive. The Directorate General of Highways is continuously improving, making its services more comprehensive, improving its public service quality, and gaining recognition from the public for its various services.

Procurement Professional Training

Before 1999, Taiwan government agencies and publicly operated businesses did not have a comprehensive system for procurement work. For decades, procurement has been conducted based on the Enforcement Rules of the Audit Act and inspection regulations. Administrative agencies have not established procurement-related rules themselves, therefore, could not effectively improve procurement efficiency. If the purchase contract did not have detailed specifications, a contract dispute could result in unsolvable problems. This is the main reason that added to the difficulty of subcontracting and service, property procurement.

Improve Training and Capability

In view of this, the Government Procurement Act was implemented in 1999 so that procurement work would have a specified legal basis. This increased the binding power of procurement documents so that procurement work could be legally authorized. Establishment of a government procurement system can increase procurement efficiency and function, and further maintain the rights of procurement colleagues.

Since the implementation of the Government Procurement Act in 1999, the Directorate General of Highways has organized over 20 sessions of basic and advanced professional training courses for procurement personnel (up to 2015) in response to the implementation of Regulations for Qualification, Examination, Training, Certification, and Management of Professional Procurement Personnel. There were 1,554 personnel members trained, and 1,320 of these obtained procurement personnel qualification. However, procurement personnel are often lost because of changes in post, so there has always been a deficit in qualified personnel. To increase the number of qualified procurement personnel to meet procurement needs, the Directorate General of Highways once again organized two sessions of procurement personnel basic training in 2016. One session each was held at the Headquarter and Central Region Training of the Training Institute, respectively. There were 122 personnel members trained, including numerous department and section chiefs. This shows the importance that each unit places on procurement work.

Students learning dispute handling in procurement class

Obtaining Licenses for More Comprehensive Procurement Work

The procurement personnel training class not only explains in detail the 114 articles of the Government Procurement Act, but also discuss in depth turnkey subcontracting implementation, joint bidding methods, selection of the most advantageous bid, lowest difference bids, electronic procurement work, and 47 other types of procedures. For teachers, the Directorate hired the Ministry of Education, National Health Insurance Administration, Overseas Community Affairs Council, and other Public Construction Commission-approved lecturers. The training center also updated to new computer teaching equipment and established a network teaching system to provide an environment for teaching electronic procurement. This shows the Directorate's focus on training procurement personnel. The procurement training courses were concluded with a test supervised by personnel from the Public Construction Commission. There were 121 participants that took the test, and 108 students passed and obtained the procurement personnel qualification. This is a passing rate of 89%. The results of this training were significant, and students worked very hard to obtain their certificates.

Because the Directorate General of Highways has a lot of procurement work, which plays an important role in highway maintenance, building, and supervision, we expect the participants to contribute what they learned to the units where they serve. Procurement personnel must maintain public interest and the principle of fairness for construction outsourcing, labor commissioning, and asset procurement. Procurement personnel must also follow ethical guideline rules and fairly, justly, and transparently execute their work. No lobbying is allowed in the implementation of procurement work, and a balanced handling according to law must be used to handle disputes, to improve procurement efficiency, reduce procurement disputes, and successfully promote the Directorate's work.

Active Restructuring of the Human Resources System

Human resource restructuring seminar

Human resource restructuring seminar - combined seminar

Human resource restructuring seminar – report by Director General Ma of the Personnel Office

Article 2 of the Regulations for the Use of Traffic Personnel stipulates “Traffic personnel referred to in this regulation refers to personnel employed by agencies under the MOTC”. Because traffic organizations are a link in Taiwan’s state-owned businesses, its nature is different than regular administrative agencies, and requires a different human resources system. This human resources system is required to successfully promote various agencies under MOTC, and as per Article 33 of the Civil Service Employment Act, “the employment of educational personnel, medical personnel, traffic personnel, and state-owned business personnel shall be defined otherwise by law”.

The Existing Human Resources System Has Few Benefits and Low Salary

In 1980, the Directorate General of Highways’ Transportation Business Division became independent, and was formed into the Taiwan Motor Transport Co., Ltd. Its main business was public road projects and road supervision, and its annual budget was changed to an official budget. This means that it is a purely administrative agency, and is no longer a business agency. However, personnel employment still used the “capital system” stated in the Regulations for the Use of Traffic Personnel.

However, new personnel under the capital system had lower starting pay than the recruitment system. Those that qualify for Class 3 start from a 320 salary point, which is six classes lower than that of the recruitment system (385). General qualification starts from 240 salary points, which is four classes lower than that of the recruitment system (280). In addition, because the Directorate General of Highways falls under “not implementing the employment rate for traffic business treatment”, employees did not receive marriage, child birth, child education, or funeral subsidies. As a result, new employee starting pay and benefits were much lower than that of the regular recruitment system administrative agencies. Thus, there is concern of a human resources gap at the Directorate, which is beginning to severely affect business development.

Restructuring the Human Resources System to Match Organizational Transformation

The Civil Service Department convened a meeting in March 20, 1996, to discuss the human resources system for traffic personnel. The resolution was: “Human resources systems of existing administrative agency-type traffic business organizations should use administrative agency human resources regulations”. MOTC invited the Civil Service Department, Ministry of Examination, Executive Yuan Directorate-General of Personnel Administration, and other related units to a meeting in 1997 to discuss restructuring and employees’ various rights. The Directorate General of Highways hoped to use a dual system to protect employee rights. The Civil Service Department indicated that traffic business organization restructuring into an administrative agency should be based on the example of the Directorate General of Telecommunications’ restructuring into an administrative agency, and did not agree to the use of a dual system. Thus, a restructuring breakthrough could not be achieved. To protect the rights of existing employees,

the Directorate has used the capital system in accordance with the simplification of the Directorate General of Highways organizational regulations in 2000, which has been used up to today.

Considering that the Directorate General of Highways is already an administrative agency and not a business organization, the Directorate will cooperate with the Executive Yuan for organizational change, and change the human resources system to a recruitment system to protect the rights of employees. After negotiation with the Civil Service Department, consensus was reached to amend the traffic and construction departments' Article 7 of the Organization Law of the Directorate General of Highways Ministry of Transportation and Communications. Personnel who had their rights infringed on can continue to use the original regulations within the 10-year transition period (later revised to 9 years). The term of expiration is when the person leaves his/her position. This solves the restructuring problem.

Change of organizational law for the Directorate General of Highways and its subordinate agencies was submitted for review by the Executive Yuan in coordination with the Legislative Yuan session period on January 6, 2011 (7th session), February 16, 2012 (8th session), and February 1, 2016 (9th session). The three-readings procedure has not yet been completed, and the restructuring has not yet been completed.

Legislators Propose Changes to the "Recruitment System"

The main tasks of the Directorate General of Highways are public road projects and road supervision, which has a big impact on the public's life. In recent years, its workload has grown significantly, and its personnel bear a heavy workload. However, because its employment system is based on the "capital system", the reporting rate for people who pass the examination is low, and employees have a high turnover rate, which makes it difficult to make up for personnel loss. This has resulted in a human resources gap problem, making restructuring very important.

Legislator Yeh I-Chin and 24 others has proposed revising the MOTC Directorate General of Highways Organizational Regulations into the MOTC The Organization law of the Directorate General of Highways Ministry of Transportation and Communications so that the Directorate General of Highways' employment system can be restructured from the existing capital system to the recruitment system of normal administrative agencies. On November 1, 2016, the three reading procedure was completed during Legislative Yuan's 8th meeting of the 2nd meeting period for the 9th session. The change was officially announced on November 16, 2016, by the president via the Executive Order document number 10500140171. The restructuring not only boosted moral, but can retain outstanding talent and introduce new blood to revitalize the agency. This is of significant help to its operations.

Clearly Setting Transitional Period Rules to Ensure Employee Rights

Because the agency restructuring is not the responsibility of the employees, the rights of existing employees should be sufficiently protected. Thus, Article 7 of the Organization law of the Directorate General of Highways Ministry of Transportation and Communications clearly states that for those who had their rights infringed can choose to follow the original regulation during the transition period (prior to June 18, 2024). Once the term expires, the person may remain at his/her original post until the person chooses to leave. Personnel who is already participating in labor insurance can transfer (remain) at the original position and continue to participate in labor insurance. When changing to other post or promoted, the person shall join the civil servant and teacher insurance as per regulations. Three promotion exams shall be conducted within five years to extend the rights of employees.

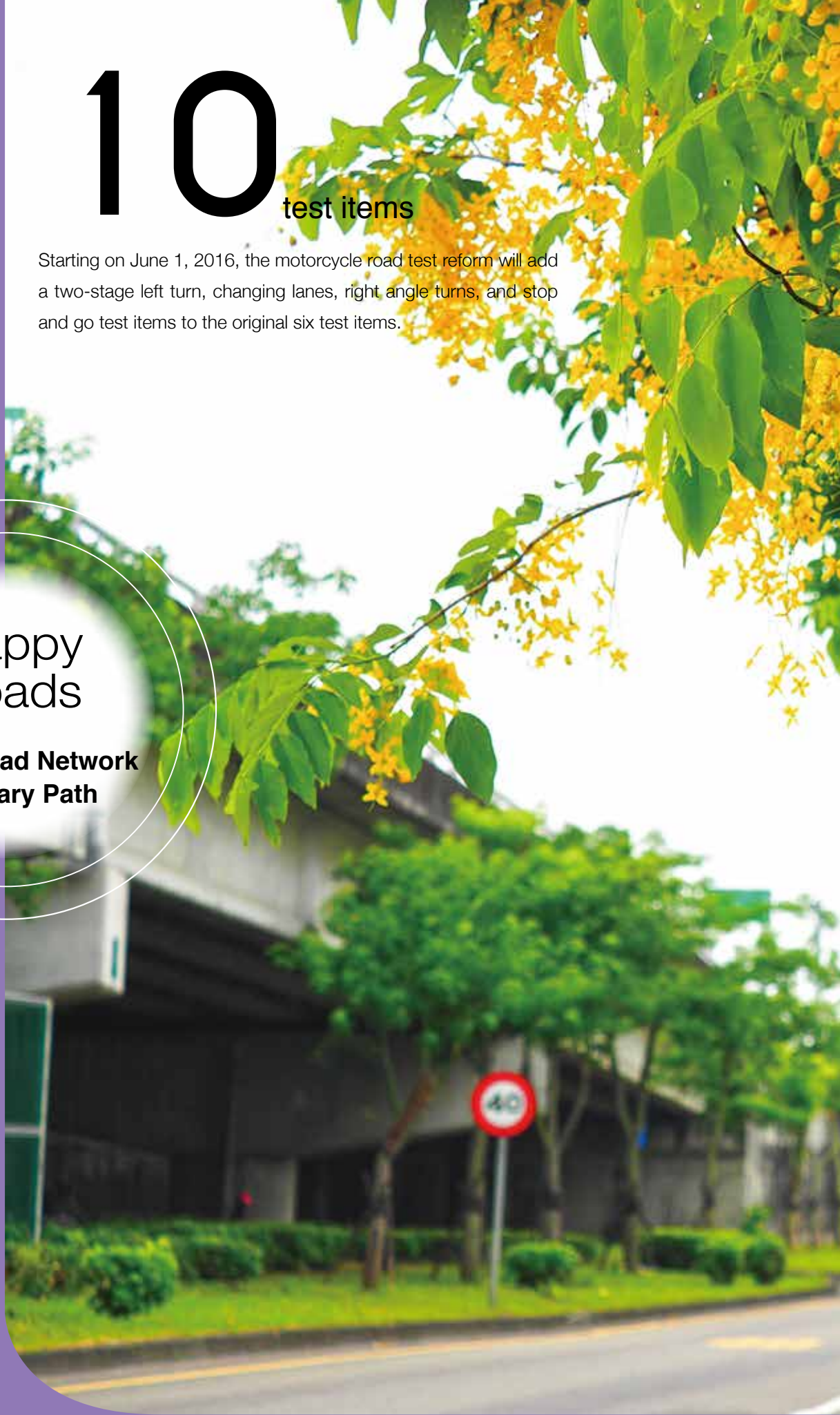
After restructuring, the Directorate established six level 1 business units, newly added the traffic management group, the transportation group, changed the new project group to the public works group, and integrated the work of the land use group and material group into the public works group, the supervisory team, and the secretariat. The auxiliary unit newly added the legal office, information, Accounting and Statistics, and anti-corruption, while maintaining the human resource office. The maintenance of the Highway Disaster Prevention Center, Road User Service Center, and Car Accident Identification Council shall be by task grouping, and shall be listed into the procedure draft. Level 2 units increased from 40 to 49. The names of subordinate agencies (organizations) will not be changed. Five regional maintenance construction offices, seven regional Motor Vehicles Office (existing seven areas will be integrated into various Motor Vehicles Office), three new construction offices (West Coast Expressway Central Region Engineering Office will be integrated into the West Coast Expressway Northern Temporary Office, East-West Expressway Kaohsiung/Tainan Office will be integrated into the West Coast Expressway Southern Temporary Offices, and the Suhua Highway Improvement Engineering Office will be maintained), and Training Institute and Materials Testing Laboratory shall be established as agencies.

Planning Restructuring and Hope for Smooth Transition

Article 8 of the Organization law of the Directorate General of Highways Ministry of Transportation and Communications stipulates "the implementation of this regulation will be determined by the Executive Yuan". Considering the appropriate treatment type, processing procedures, preparation form, and the organizational law this agency belongs to after this Directorate is restructured must be reported to the Executive Yuan for approval, the implementation date is planned for six months after the announcement by the president. The Directorate has established a preparation group for preparing restructuring related matters. Deputy Director General Huang Yun-Guei will act as the convener and the managers of each group/office will be committee members. The committee is divided into 10 work groups to actively plan relevant tasks. To allow colleagues to understand their rights after the restructuring, the Directorate General of Highways' human resource office will hold two seminars in Northern, Central, Southern, and Eastern regions. After the treatment type after the restructuring is set, the Directorate General of Highways and its human resource units will conduct a one-on-one interview to explain the differences before and after the restructuring. That way, colleagues can make the best choice and successfully complete restructuring related work.

10 test items

Starting on June 1, 2016, the motorcycle road test reform will add a two-stage left turn, changing lanes, right angle turns, and stop and go test items to the original six test items.

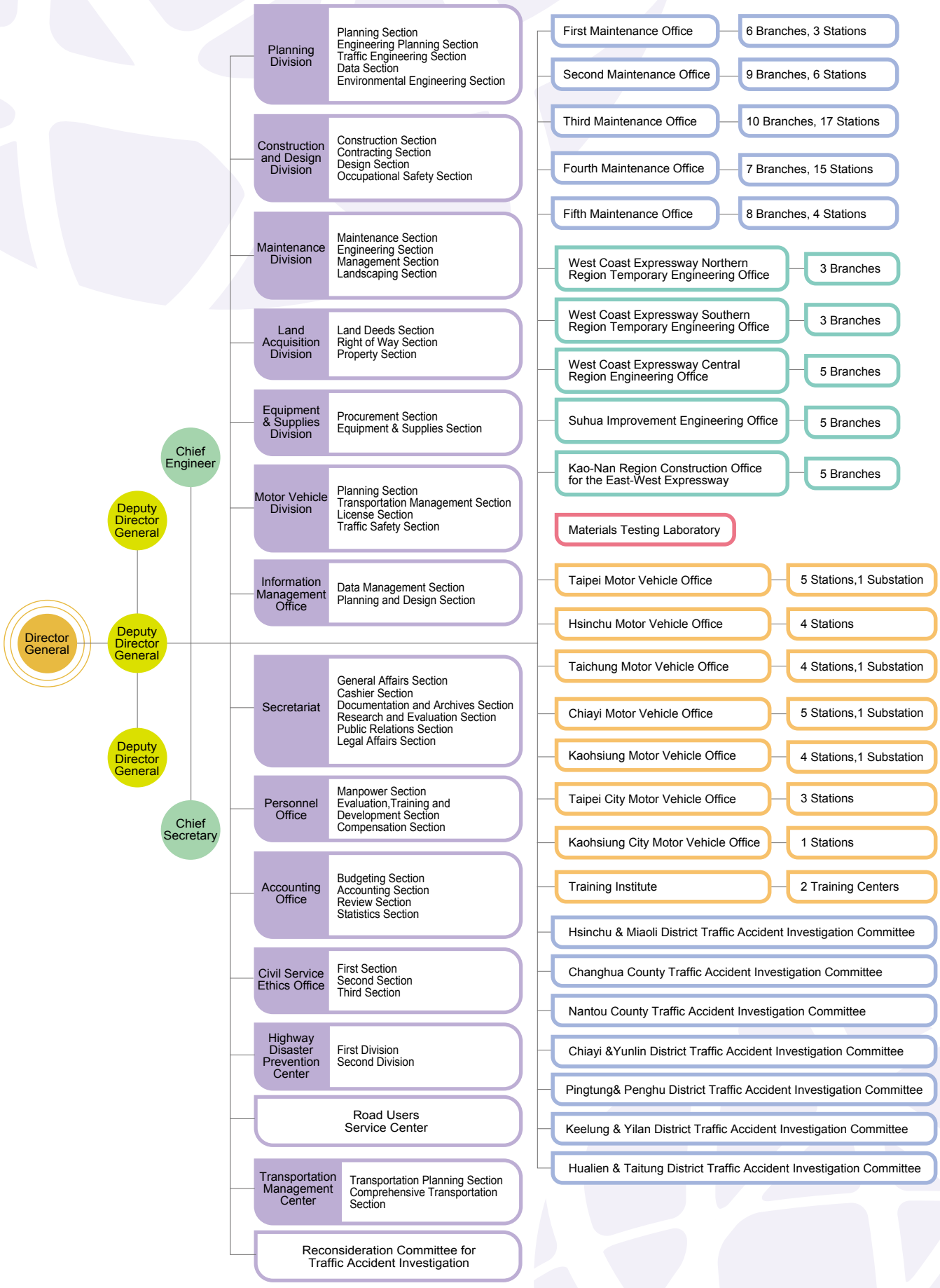


Happy Roads

Happy Road Network Visionary Path

A long road lies between your starting point and home. Sometimes the way home is on twisting and winding roads. We are using the road users' perspective to plan and promote future implementation direction and to actively build roads that allow happy use. Our objective is to make the road home safer, more convenient, and more beautiful!

Organizational Structure



Research and Development

Research item	Research unit	Research personnel
The reflective intensity of heat treated polyester marking line	Materials Testing Laboratory	Huang Sunn-jer, He Hung-wen, Chu Chien-tung, Chen Chih-lin, Hon Min-jay, Chiu Jui-chang
Use of RAP on asphalt paved surface tile	Materials Testing Laboratory	Huang Sunn-jer, He Hung-wen, Chu Chien-tung, Chen Hsien-chou, Hon Min-jay, Hung Li-yen, Su Shin-yung
Correlation between paved surface temperature and asphalt concrete density	Materials Testing Laboratory	Huang Sunn-jer, He Hung-wen, Chu Chien-tung, Chen Hsien-chou, Hon Min-jay, Lu Yi-ting, Kuo Hung-teng
Application of license plate identification combined with car inspection line	Taipei Motor Vehicle Office	Chen Yu-hao, Wei Wu-cheng, Chen Shou-chung, Chen Chih-ying, Liao Cheng-chih
Application of screen display of car mileage inspection data	Taipei City Motor Vehicle Office	Lin Hsin-chih, Lai I-jen, Chen I-tsang
Big data analysis of Taipei City Motor Vehicle Office jurisdiction motorcycle fuel fees non-payment and owner type	Taipei City Motor Vehicle Office	Ke Po-wen, Wang Jui-mei
Motorcycle written test question base	Shilin Station, Taipei City Motor Vehicle Office	Lin Cheng-yang, Chen Ying-chung, Liang Po-jung, Chen Yu-yen, Huang Chien-i
Website operation performance analysis	Hsinchu Motor Vehicle Office	Lin Tsui-jung, Chiang Shu-jen, Liao Yun-chih, Chen Chien-i
Catching driver’ s license substitution test takers	Kaohsiung Motor Vehicle Office	Tung Chi-cheng, Huang Wan-i, Tsai Yu-ying, Kuo Chun-nan, Tseng I-ming, Hsieh Chiu-min
Simplification of motorcycle fuel tax transfer – developing smart comparison and selection system	Pingtung Station, Kaohsiung Motor Vehicle Office	Jung Pei-hua, Kung Chien-yuan, Chang Cheng-hsiang, Ling Ching-ming, Hsieh Ying-ching, Chuang Hsiu-chin

Administrative Project

Project name	Annual budget (NTD 1,000)	Timeframe (year)	Supervisory level
The Suhua Highway of Provincial Highway No. 9 Mountainous Section Improvement Project	7,164,836	2010 ~ 2020	Executive Yuan
Follow-Up to the West Coast Expressway Continuous Construction Project	8,329,365	2009 ~ 2019	Executive Yuan
Follow-Up to the South Link Highway of Provincial Highway No. 9 Widening Project	2,866,062	2011 ~ 2020	Executive Yuan
East-West Expressway Construction Projects and Network Improvement Projects	574,000	2009 ~ 2016	Ministry
Danjiang Bridge and Connecting Roads Construction Project	1,679,000	2014 ~ 2020	Ministry
Highway Public Transport Enhancement Project	4,609,975	2013 ~ 2016	Ministry
Region-Based Road System Construction Project Four Year Project (Highway System; 2015 - 2018)	3,998,630	2015 ~ 2018	Ministry
Construction of Provincial Highway Bridges Needed for Regional Drainage Regulation and Environment Construction Plan for Major Rivers	9,383	2015 ~ 2020	Ministry
Construction of Provincial Highway Bridges Needed for the River Environment Construction Plan for Major Rivers	309,280	2015 ~ 2020	Ministry
Highway Improvement Project	2,865,301	2013 ~ 2018	Ministry
National Bicycle Friendly Route Network Planning Project and The contruction for Bicycle Network by MOTC Project	248,793	2015 ~ 2018	Ministry
Highway Maintenance Project	10,980,770	2016 ~ 2016	Autonomous Managemen

Competition Results

Number	Evaluation or completion name	Awarded unit	Result
1	Ministry of Education, Sport Administration, organized "10 classic bicycle route selection activity" – Northeast old Caoling circular bicycle route	First Maintenance Office	Won the 10 classic bicycle routes
2	2016 Ministry of Labor promoted outstanding labor safety and health public works - Provincial Highway 3 97K+969 Zhonggangxi Bridge rebuilding construction	Second Maintenance Office	Excellent
3	MOTC "Beautiful Life Link" fan page	Third Maintenance Office	First place
4	2016 MOTC Golden Road Award – outstanding landscape category (provincial highway team)	Third Maintenance Office	First place
5	2016 MOTC Golden Road Award – road user information category	Third Maintenance Office	First place
6	2016 MOTC "Golden Road Award" outstanding construction category: Provincial Highway 20 82K+500-95K+506 Typhoon Morakot disaster rebuilding construction (third mark 90K+2011 - 92K+980 including Shengjing Bridge and Taoyuan NO.1 Bridge)	Third Maintenance Office	First place
7	2016 MOTC Golden Road Award – road maintenance category (offices)	Fourth Maintenance Office	First place
8	2015 Participation with disaster prevention and rescue	Fourth Maintenance Office	Superior
9	2016 MOTC Golden Road Award – road maintenance category (branches)	Alishan branch, Fifth Maintenance Office	First place
10	2016 Ministry of Labor promoted labor safety and health outstanding public works selection/recommendation - West Coast Expressway 130K+123-134K+271 Fangli Da'an main line elevated project	West Coast Expressway Central Region Engineering Office	Excellent
11	15th Public Construction Golden Quality Award – civil engineering level 1 – The Suhua Highway of Provincial Highway No. 9 Dong'ao Dongyue section construction(A3 mark)	Suhua Improvement Engineering Office	Excellent
12	15th Public Construction Goden Quality Award -West Coast Expressway 195K+995-199K+348.5(WH50 – 2nd mark) Wanggong to Yongxing section construction	West Coast Expressway Central Region Engineering Office	Excellent
13	15th Public Construction Goden Quality Award -Provincial Highway No. 9 412K+350-415K+500 widening improvement construction (old piling number 426K+680-430K+100)	Kao-Nan Region Construction Office for the East-West Expressway	Honorable mentions
14	15th Public Construction Goden Quality Award –The Suhua Highway of Provincial Highway No. 9 Su'ao Yongle section construction	Suhua Improvement Engineering Office	Honorable mentions
15	Government Service Quality Award from the Executive Yuan – Front line service agency category	Banqiao Station, Taipei Motor Vehicle Office	Service quality award
16	2015 annual evaluation of motor vehicle agencies collecting vehicle fuel fees	Taipei Motor Vehicle Office	Excellent
17	2015 Excutive Yuan "Improvement Program for Traffic Order and Safety" motor vehicle office team 2	Hsinchu Motor Vehicle Office	First place
18	2016 Civil servant and teacher volunteer participation benchmark case selection promoted by various agencies	Hsinchu Motor Vehicle Office	Excellent
19	2015 annual evaluation of motor vehicle agencies collecting vehicle fuel fees	Hsinchu Motor Vehicle Office	Superior

Number	Evaluation or completion name	Awarded unit	Result
20	2015 “Car transport survey” good operating truck survey unit	Taichung Motor Vehicle Office	First place
21	2015 Excutive Yuan “Improvement Program for Traffic Order and Safety” Annual Inspection- motor vehicle office team 1	Taichung Motor Vehicle Office	First place
22	2015 annual evaluation of motor vehicle agencies collecting vehicle fuel fees	Taichung Motor Vehicle Office	Superior
23	2015 annual evaluation of motor vehicle agencies collecting vehicle fuel fees	Chiayi Motor Vehicle Office	Superior
24	2015 National defense mobilization three-in-one Outstanding report evaluation - first place in the nation	Chiayi Motor Vehicle Office	First place
25	2015 MOTC innovation proposals competition– innovation award	Kaohsiung Motor Vehicle Office	First Class
26	2015 annual evaluation of motor vehicle agencies collecting vehicle fuel fees	Kaohsiung Motor Vehicle Office	Superior
27	2015 Excutive Yuan “Improvement Program for Traffic Order and Safety” Annual Inspection– group overall score	Kaohsiung Motor Vehicle Office	First place
28	MOTC “8th Road Safety Innovation Contribution Award” – motor vehicle category	Kaohsiung Motor Vehicle Office	First place
29	2015 Excutive Yuan “Improvement Program for Traffic Order and Safety” Annual Inspection— Golden Safety Award	Taipei City Motor Vehicle Office	First place
30	2015 annual evaluation of motor vehicle agencies collecting vehicle fuel fees	Taipei City Motor Vehicle Office	Superior
31	2015 MOTC innovation proposals competition- “the payment with virtual account tech. can be safer and easier for license plate selecting and competitive bidding”	Kaohsiung City Motor Vehicle Office	Creativity award
32	2015 annual evaluation of motor vehicle agencies collecting vehicle fuel fees	Kaohsiung City Motor Vehicle Office	Superior
33	Asphalt tile manufacturing method	Materials Testing Laboratory	Obtained patent

Major Events

January

1	In response to Taoyuan county being upgraded to a special municipality, this agency's Taoyuan County Traffic Accident Investigation Committee will be transferred to Taoyuan City Government on January 1, 2016.	Personnel Office
1	In response to revision of Article 65 of the Rules on Road Traffic Safety, a road test is now required for light motorcycle license testing. Starting from January 1, 2016, light motorcycle test will include a road test. Applicants can receive their light motorcycle license after passing the written and road test (for light motorcycle riders).	Motor Vehicle Division
1	West Coast Expressway 204K+530-209K+087 (WH52 mark) Xin St. - Dacheng Rd. section rebuilding project began on January 1, 2016	Construction and Design Division
2	This agency's Equipment & Supplies Division leader post (the original group leader, Li Chih-Chung, retired) was handed over to the deputy team leader of the Planning Division,Wu Wen-Yi. The MOTC document number 1047101763 approved the promotion on December 23, 2015.	Personnel Office
6	January 6, 2016, the Director General surveyed the Provincial Highway No. 9 Suhua Highway A section construction work.	Construction and Design Division
9	Danjiang Bridge second mark began on January 9, 2016.	Construction and Design Division
18	Hsinchu Area Motor Vehicles Office Director General post (previous director, Chang Chao-Yang retired) was taken over by Taipei City Motor Vehicles Office deputy Director General Lin Tsui-Jung. MOTC document number 1047101582 approved the promotion on November 24, 2015.	Personnel Office
18	Fifth Maintenance Office director's post (previous director, Director General Weng Yu-Lai, retired) was taken over by Second District Maintenance Construction Office's deputy Director General Chen Chia-Ying. MOTC document number 1047101582 approved the promotion on November 24, 2015.	Personnel Office
21	In response to Winter Vacation and the Chinese New Year traffic alleviation period, a consumer boost subsidy project was initiated on January 21, 2016. When buying one full-price ticket, children under 12 or elderly over 65 years old can travel with the buyer for free. Junior high or older students can get tickets for free with their student ID.	Motor Vehicle Division

February

3	February 3, 2016 - Environmental Protection Administration's inspector's corps inspect the Suhua Improvement Project on site.	Planning Division
5~15	The 2016 Chinese New Year Holiday Traffic Alleviation Plan was implemented from February 5 – 15, 2016. This agency, various maintenance construction offices, and Motor Vehicles Offices formed a traffic alleviation team to handle provincial highway road traffic, bus allocation, and new announcements, and to effectively grasp traffic alleviation information and increase response ability. During the traffic alleviation period, a daily average of 11,019 bus runs was employed on western Provincial Highway. This is equivalent of transporting 233,967 people. Provincial Highway No. 5 had a daily average of 1,690 bus runs and transported 31,019 people.	Planning Division Motor Vehicle Division
24	On February 24, 2016, the 2015 Public highway transportation Project Results and 2016 Outlook Seminar was held at the Gis Conference center. Local government and operators were invited to share the bus route to schools experience.	Motor Vehicle Division
27~29	This agency implemented the 2016 228 Holiday Traffic Alleviation Plan from February 27 – 29, 2016. This agency, various maintenance construction offices, and various Motor Vehicles Offices formed a traffic alleviation team to handle provincial highway situation, bus allocation, and new announcements, and to effectively handle traffic alleviation information and response.	Planning Division

March

1	Starting March 1, 2016, driver's license test for small cars will utilize a dual road test system. Eight supervisory units and 11 privately operated training facilities will conduct a one year trial and assess the results to determine possibility of overall implementation.	Motor Vehicle Division
1	Danjiang Bridge 2K+606~5K+000 section, 7K+000-8K+165 section (Danjiang second mark) began construction on March 1, 2016.	Construction and Design Division
1	To improve public transportation management, this agency established the MOTC Directorate General of Highways Transportation Management Center task unit on March 1, 2016.	Personnel Office
14	March 14, 2016 – Deputy Director General Huang led colleagues from this center to inspect the DRTS Project Promotion Plan at Hengshan Township.	Transportation Management Center
15	March 15, 2016 – Disciplinary citations were mailed out for the first time for motorcycle fuel tax. Penalties and disciplinary citations were given to vehicle owners who have not paid motorcycle fuel tax from before 2014 according to Article 75 of the Highway Act. A total of 1,189,016 citations were given out with the payment deadline of April 30, 2016.	Motor Vehicle Division
21	March 21, 2016 – the Director General inspected the Provincial Highway No. 9 Suhua Improvement Project (Su'ao Heping section) site.	Construction and Design Division
22	In addition to the six motorcycle road test items, two-stage left turn, changing lanes, right angle turn, and stop and start was added in June 2016. On the morning of March 22, 2016, print, radio, and electronic media were invited to the Banqiao Area Motor Vehicles Office to experience the new motorcycle road test items.	Motor Vehicle Division
22	March 22, 2016 – The MOTC organized the selection for Provincial Highway No. 9 southern loop highway C2 mark golden safety award.	Construction and Design Division
30	Directorate General of Highways Director General Chao Hsing-Hua,Third Maintenance Office Section Chief Wang Ching-Hsiung, Kaohsiung City Motor Vehicles Office personnel Wu Pei-Hsuan, and Fourth Maintenance Office Chief Chen Kuo-Cheng received the MOTC 2016 Model Civil Servant Award.	Personnel Office

April

1~5	This year's Ching Ming holiday (4/1 - 4/5) traffic alleviation work successfully wrapped up on April 6, 2016. On average, 10,854 bus runs were conducted per day on western Provincial Highway and 222,901 people were transported. Provincial Highway No. 5 had an average of 1,839 bus runs per day and transported 37,774 people.	Transportation Management Center
2~4	To alleviate traffic congestion on Provincial Highway No. 5 and in the Yilan area, the cruise type bus went on trial during the Ching Ming holiday period (4/2 - 4/4) to shuttle people from Taipei to scenic areas in Yilan. Overall, 7 routes and 18 runs were conducted to transport 270. The passenger rate was about 50.0%.	Transportation Management Center
8	April 8, 2016 - Provincial Highway No. 9 Suhua Highway A3 mark Dong'ao Dongyue section rebuilding project completed.	Construction and Design Division
10	Alishan flower season successfully wrapped up on April 10, 2016. This agency planned the traffic control for the flower season (3/10 - 4/10) well, and there was no traffic congestion during the period.	Planning Division
12	Directorate General of Highways' first Happy Highway Exhibit special activity in 2016 "Danjiang Bridge International Design Competition Special Exhibit" closed on April 12, 2016.	Road Users Service CenterRoad Users Service Center
13	April 13, 2016 – The Director General inspected the Provincial Highway No. 9 Suhua Highway site (Area A and B).	Construction and Design Division
18	April 18, 2016 - MOTC audited the Provincial Highway No. 9 southern loop highway C2 mark project.	Construction and Design Division

19~21	April 19 - 21, 2016 – This agency's SafeTaiwan was exhibited at the Fire & Safety exhibit.	Information Management Office
20	April 20, 2016 - MOTC audited the Provincial Highway 66/Taoyuan Highway 81/Taoyuan Highway 79/and Provincial Highway 31 intersection 3D improvement project.	Construction and Design Division
21	April 21, 2016 - Provincial Highway No. 9Hualien/Taitung 3 phase road 260K+150-268K+500(Fuyuan to Ruibei section) road widening project began.	Construction and Design Division
22	During the flood period, Director General Chao Hsing-Hua of this agency especially invited all unit heads to the 2016 Flood Control Inventory and Preparation meeting on April 22, 2016. During the meeting, flood control preparations from each unit were inventoried one by one. Disaster prevention lessons from the 0206 earthquake, Kumamoto earthquake, and Ecuador earthquake were included in the discussion to protect the safety of road users.	Highway Disaster Prevention Center
26	April 26, 2016 – Ceremony for the breaking through of the Provincial Highway No. 9 Suhua Highway A2 mark Dong'ao tunnel rebuilding project.	Construction and Design Division

May

1	To cultivate correct driving habits and ethics for motorcycle riders in actual road scenarios, road scenario questions will be included on the motorcycle driver's license written test starting on May 1, 2016.	Motor Vehicle Division
2	To care for elderly drivers and the safety of other road users, each supervisory agency will start a trial provision of cognitive tests for elderly drivers starting May 2, 2016.	Motor Vehicle Division
3	On May 3, 2016, President Ma hosted the completion ceremony for the Provincial Highway No. 9 Suhua Highway's Guanyin Tunnel southbound line.	Construction and Design Division
26	Taitung Dawu widening of Provincial Highway No. 9 has the flatness of western Provincial Highway. The Daxi Rd. section 421k+793 - 422k+606 has completed widening on April 30, 2016. The road was opened to traffic on May 26, 2016.	Maintenance Division
29	May 29, 2016 – The Director General visited the West Coast Expressway Baishatun to Nantongwan Section Rebuilding Project, the West Coast Expressway Fangli Da'an Main Line Elevation Project, and the West Coast Expressway Da'an Dajia Main Line Elevation Project.	Construction and Design Division
31	May 31, 2016 - Deputy Minister Fan Chih-Ku lead a team to the Directorate General of Highways' Fourth Maintenance Office to observe the Suhua Highway disaster prevention mechanism. The minister not only learned about the early warning mechanism and disaster prevention traffic operation control room, but also visited the site. The construction department also demonstrated foreword command center operations, road closing operations, disaster survey, and disaster repair.	Highway Disaster Prevention Center

June

1	Starting on June 1, 2016, motorcycle road test will include two-stage left turn, changing lanes, right angle turns, and stop and start.	Motor Vehicle Division
4	June 4, 2016 – The Director General observing the Suhua Highway A2 mark project.	Construction and Design Division
15	June 15, 2016 – The Director General observing the east-west expressway north bound 64K+005 intersection flooding.	Construction and Design Division
19	June 19, 2016 – the Ministry of Culture surveyed the Blihun archeology site p3n and p3s for important culture phenomenon.	Planning Division

20	To encourage the public to pay their motorcycle fuel tax on time, the agency specially held the “Good Luck Drawings” motorcycle fuel tax lottery activity. The activity period is from June 20 - July 31, 2016.	Motor Vehicle Division
20	To improve the public’s traffic safety knowledge and advocate road users to create a safe traffic environment, the agency hold a “Safety Q&A” award lottery activity. The activity was held from June 20 t-August 31, 2016.	Motor Vehicle Division
23	Chiayi Motor Vehicle Office’s deputy director post (the original deputy Director General , Gao Fu-Cai retired) was handed over to the section chief of this agency’s Motor Vehicle Division, Sun Jung-Te. The promotion was approved by MOTC document number 1057100770 on June 23, 2016.	Personnel Office
23	Chiayi/Yunlin Region Traffic Accident Investigation Committee chairman’s post (original chairman, Gao Fu-Cai, retired) was handed over to Chiayi Motor Vehicle Office’s Deputy Director General Sun Jung-Te. The appointment was approved by MOTC document number 10571007701 on June 23, 2016.	Personnel Office
23	First Maintenance Office’s deputy Director General post (the original project section deputy Director General Chang Chun-Kuei retired) was given to the Fourth Maintenance Office’s Engineering Division Deputy Director General Chen Chun-Yao. The appointment was approved by MOTC document number 10571007702 on June 23, 2016.	Personnel Office
23	The Fourth Maintenance Office’s deputy Director General post was given to that office’s Engineering Division’s Public Works Department section chief Liu Shih-Tung. The appointment was approved by MOTC document number 10571007702 on June 23, 2016.	Personnel Office
23	The Fifth Maintenance Office’s deputy Director General post (the original Engineering Division deputy Director General Tsai Chang-Li retired) was given to that office’s Engineering Division’s Public Works Department section chief Chen Hsi-En. The appointment was approved by MOTC document number 10571007702 on June 23, 2016.	Personnel Office
30	June 30, 2016 – The director accompanying the minister in observation of the Suhua Improvement Project, Gufeng Tunnel northbound breaking through and Provincial Highway No. 9 Suhua Highway.	New project team

July

1	Suhua Improvement Project discovered the Blihun site on July 1, 2016, which was identified as a national archeology site.	Planning Division
1	On April 29, 2016, Article 39-2 of the Rules on Road Traffic Safety was revised. The motorcycle tire tread depth became a regular inspection item in license application inspection and for the heavy motorcycle regular inspection. The new revision was implemented on July 1, 2016.	Motor Vehicle Division
1	Staring from July 1, 2016, all small cars and trucks must have mandatory tire pressure detection system out of the factory.	Motor Vehicle Division
1	Starting July 1, 2016, the Taipei City Office, the Taipei Office, Kaohsiung City Office, and Kaohsiung Office will begin trial on accepting credit card payment of supervision service charges at the window counter.	Motor Vehicle Division
1	Hsinchu/Miaoli region Traffic Accident Investigation Committee Director General post (the original director, Tsai Chung-Tun, retired) was given to Hsinchu Motor Vehicle Office chief Chu Shih-Heng. The appointment was approved by MOTC document 1057100827 on July 1, 2016.	Personnel Office
4	Directorate General of Highways’ second 2016 Happy Highway Exhibit special exhibition activity, “Road Supervision Treasure Hunt”, ended on July 4, 2016.	Road Users Service Center
5	Our West Africa ally Burkina Faso’s Transportation Minister Souleymane Soulama led a team and visited Taiwan to understand our nation’s driver’s license and vehicle license issuing procedures and management principles. On July 5, 2016, this agency’s Director Chao Hsing-Hua personally hosted the delegation during a visit to Shilin Motor Vehicle Office.	Motor Vehicle Division
7	On July 7, 2016, Provincial Highway No. 9 Suhua Highway’s Dong’ao tunnel project southbound line was openned.	Construction and Design Division
12	July 12, 2016, Deputy Minister Fan inspected the Provincial Highway No. 9Suhua Improvement Project B3 mark project.	Construction and Design Division
17	July 17, 2016 - Provincial Highway No. 9 southern loop highway C2 mark tunnel, northbound Nankou to Shujing section project was completed.	Construction and Design Division

19	On July 19, 2016, at 13:00, the 197-EE bus from Rose Stone Transportation Company had a fire on National Provincial Highway No. 2 west-bound 2.8 km. The fire killed all 26 people on board.	Transportation Management Center
20	July 20, 2016 - West Coast Expressway Central Region Engineering Office West Coast Expressway 130K+123-134K+271 Fangli Da'an main line elevation project received the Ministry of Labor's 2016 Promoting Labor Safety and Health Outstanding Public Works Project – Group A Honorable Mentions.	Construction and Design Division
20	July 20, 2016 - West Coast Northern Region Engineering Office West Coast Expressway WH-09A mark (48K+970~54K+320) main line rebuilding project won the Ministry of Labor's Promoting Labor Safety and Health Outstanding Public Works Project – Group A Best Work award.	Construction and Design Division
28	Control Yuan traffic and procurement committee inspected the Suhua Improvement Project and its implementation.	Construction and Design Division
28	Provincial Highway 68 starting point connecting to Hsinchu City Rongbin Rd. was open to traffic on July 28 at 13:00. Provincial Highway 68 Nanliao end is the starting point, and moves westward across Provincial Highway 15 Zhugang Bridge to Hsinchu City urban planning road.	Maintenance Division

August

7	To encourage the public to pay their motorcycle fuel tax on time, the Directorate General of Highways held a second drawing for the "Good Luck Drawings" motorcycle fuel tax lottery activity.	Motor Vehicle Division
15	The 26 Motor Vehicles Office across the nation began introducing road tests on August 15, 2016. A "passed road test" will be added to the car driver's license, driver history, the review document, and Japanese translated note.	Motor Vehicle Division
22	This agency's Director General post was appointed to MOTC's Taiwan Provincial Highway Rebuilding Project Bureau's Director General Chen Yen Bo as per Executive Yuan's document number 1050050519 on August 12, 2016.	Personnel Office
24	MOTC Political Deputy Minister Wang Guo-Cai inspected Suhua Improvement Project and its progress.	Construction and Design Division

September

1	Starting in September 1, 2016, all operating bus regular inspection must check for a bus maintenance record within the last four months.	Motor Vehicle Division
8	Suhua Highway Improvement Engineering Office organized the 3rd Suhua Improvement Project technical forum.	Construction and Design Division
9	"Safety Q&A" award lottery activity ended on August 31, 2016. The lottery was conducted on September 9 in this agency's third floor conference number 1 by Deputy Director General Huang under the witness of lawyers.	Motor Vehicle Division
10	The investigation to the China tour group bus fire was complete. The driver was charged with murder. After two months of enforced audit, violations significantly decreased starting from end of August. This proves that audits have a warning effect. Audits will continue in the future, but the frequency may return to normal audit frequency.	Motor Vehicle Division
14	The 2016 Mid-Autumn Festival vacation traffic alleviation plan was implemented. Traffic management and increased public transportation was implemented for road sections that are easily congested and during peak time.	Planning Division
26	Directorate General of Highways' third 2016 special exhibition activity for the Happy Highway Exhibit "Come Ride the Directorate General of Highways -Highway Bus 70 Year Anniversary Historical Artifact and File Special Exhibit" began on September 26, 2016.	Road Users Service Center

October

1	Starting in October 1, the Taichung Motor Vehicles Office and Chiayi Motor Vehicles Office will start accepting credit card payment for various supervision fees.	Motor Vehicle Division
7~11	The Double 10 holiday traffic alleviation plan was implemented from October 7 – 11, 2016. The plan implemented traffic management and increased public transportation for road sections that are easily congested and during peak hours. A daily average of 11,969 bus runs were conducted on western Provincial Highway and 239,398 people were transported. Provincial Highway No. 5 had an average of 1,957 bus runs a day and transported 34,581 people.	Planning team Transport office
18	Provincial Highway No. 9 Huatung Highway Safe Landscape Boulevard Project was approved by Executive Yuan document number 1050093419.	Planning Division
19	This agency's SafeTaiwan APP won the Innovative Product Award for the system, tool, or application software category for the 2016 Information Month.	Information Office
20	MOTC Deputy Minister Qi inspected Hualien province, county, and township disasters, and directed various road competent authorities to draft appropriate work methods, increase personnel, and invest assets to disaster repair. The objective was to return traffic flow as soon as possible.	Road maintenance team
25	This agency held a road test demonstration at the Yunlin Yongching driver school. A total of 66 driver's training operators participated.	Motor Vehicle Division
26	To promote driver's license management system for elderly drivers, the Training Institute began holding a 10 session (280 people) cognitive function test implementation personnel training on October 26, 2016. The subjects are physical examination clinic and hospital personnel in different regions.	Motor Vehicle Division
26	The minister visited Yilan area traffic building, and indicated that the MOTC should study the impact of Suhua Improvement Project after it is open to traffic. The minister requested that county governments give priority to roads with higher project benefits and feasible linking roads.	Planning Division
29	The minister and director hosted the Provincial Highway No. 9 Suhua Highway Gufeng Tunnel southbound breakthrough ceremony.	Construction and Design Division

November

2	Danjiang Bridge and liking road rebuilding project 1st mark project was completed on November 2, 2016.	Construction and Design Division
8	Implemented the first meeting for the 2017 Wuling Farm cherry blossom season traffic alleviation plan. Wuling Farm, Taichung City Government, and the Yilan County government were invited to study relevant traffic alleviation measures.	Planning Division
10	The 16th Public Construction Golden Quality Award: Suhua Improvement Project Offices "Provincial Highway No. 9 Suhua Highway Su'ao Yongle section rebuilding project won Best work".	Construction and Design Division
10	The 16th Public Construction Golden Quality Award: the Kaohsiung/Tainan Offices "Provincial Highway No. 9412K+350 - 415K+500 (old piling number 426K+680 - 430K+100) widening improvement project won Honorable Mentions".	Construction and Design Division
10	The 16th Public Construction Golden Quality Award: West Coast Offices "West Coast Expressway 195K+995 - 199K+348.5 (WH50-2 mark) Wanggong to Yongxing section rebuilding project won the excellence award"	Construction and Design Division
15	MOTC Director General inspected Provincial Highway 18 (Dingliu to Wuhuliao Bridge section) and the Alishan Tourism Boulevard proposed by Chiayi County Government.	Planning Division
16	"MOTC Directorate General of Highways Organizational Rules " was renamed the "MOTC The Organization law of the Directorate General of Highways Ministry of Transportation and Communications". The revision was passed by the Legislative Yuan on November 1, 2016. On November 1, 2016, the three reading procedure was completed during Legislative Yuan's 8th meeting of the 2nd meeting period for the 9th session. The change was officially announced on November 16, 2016, by the president via the Executive Order document number 10500140171. The order was published in the Presidential Office Bulletin No. 7274.	Personnel Office

21	MOTC government affairs Deputy Minister Wang Guo-Cai inspected Follow-Up to the South Link Highway of Provincial Highway No. 9 Widening Project A3 mark, C2 mark project.	Construction and Design Division
21	Directorate General of Highways' Fourth Maintenance Office's Maintenance Department section chief Lin Wen-Hsiung won the 2016 civil servant outstanding contribution award. He was given the award on December 14, 2016 at the Examination Yuan's Chuanxian Building 10th floor hall. The Examination Yuan minister hosted the ceremony and commended Lin for his professionalism and outstanding contribution.	Personnel Office
30	Provincial Highway 65 Tucheng - interchange (southbound line connecting to Chenglin Bridge) ramp addition project was open to traffic at 6:00 am on November 30, 2016.	Maintenance Division
30	This agency's "Third-Generation Motor Vehicle and Driver Information System Building Outsourcing Service Plan" won the itSMF's "2016 ITeS Award – Outstanding Technology Service Management Project for a Public Department Superior Award." Information Management Office Director General Chen Shou-Chiang won the 2016 ITeS Award – Outstanding Technology Service Manager Award.	Information Management Office

December

6	Executive Yuan government affairs committee member cum Public Construction Commission chairman Wu Hung-Mou visited the Provincial Highway No. 9 Suhua Improvement Project.	Construction and Design Division
15	National Development Council visited and evaluated the Provincial Highway No. 9 Suhua Improvement Project.	Construction and Design Division
21	2016 December 21 MOTC Counselor Huang Ting-Huan led a team to audit Directorate General of Highways' 2016 traffic mobilization preparation and natural disaster prevention and rescue work. The Directorate General of Highways had the Highway Disaster Prevention Center's Deputy Executive Secretary Meng provide a report. Reading of electronic data and on-site drill were used for evaluation. This comprehensively demonstrated this agency's implementation of work, and it's familiarity with the work scope.	Highway Disaster Prevention Center
27	December 27, 2016 - MOTC government affairs Deputy Minister Wong Kou-Tsai and Legislator Lu Sun-Ling inspected the Danjiang Bridge and Connecting Roads Construction Project.	Construction and Design Division
28	Provincial Highway 88 Dafa interchange east bound exit ramp rebuilding project was open to traffic at 7:00 am on December 28, 2016	Maintenance Division

Budget Execution and Reservation

Budget execution

Revenues

2016 The DGH had budgeted revenue of NT$7,569,861,000 in 2016, with receipts of NT$8,934,020,000 and receivables of NT$477,267,000 (6.30 percent of budgeted revenue) for a total of NT$9,411,287,000 and a budget execution rate of 124.33 percent.

Previous years The DGH had receivable annual revenue of NT$515,003,000, with receipts of NT$507,789,000 (98.60 percent of receivable annual revenue). The surplus of NT$7,214,000 (1.40 percent of budgeted revenue) was carried forward to the following year.

Expenditures

2016 The DGH had budgeted expenditures of NT$51,699,769,000 in 2016, with payments of NT$45,635,175,000, accounts payable of NT$33,459,000, treasury payments of NT$1,016,571,000 (1.97 percent of budgeted expenditures) and a suspense balance of NT$1,921,321,000 for a suspense balance execution rate of 94.02 percent.

Previous years Encumbrances totaled NT$4,556,568,000, with payments of NT$3,425,167,000, write-offs and deductions of NT$202,960,000 (4.45 percent of encumbrances), and a suspense balance of NT$387,442,000 for a suspense balance execution rate of 88.13 percent.

Budget reservation

Expenditures

2016 Budgeted encumbrances totaled NT$5,048,023,000 (9.76 percent of the budgeted amount).

Previous years Budgeted encumbrances totaled NT$928,441,000 (20.38 percent of encumbrances).

Total encumbrances of NT$5,976,464,000 (10.62 percent of budgeted encumbrances) were carried forward to the following year.

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