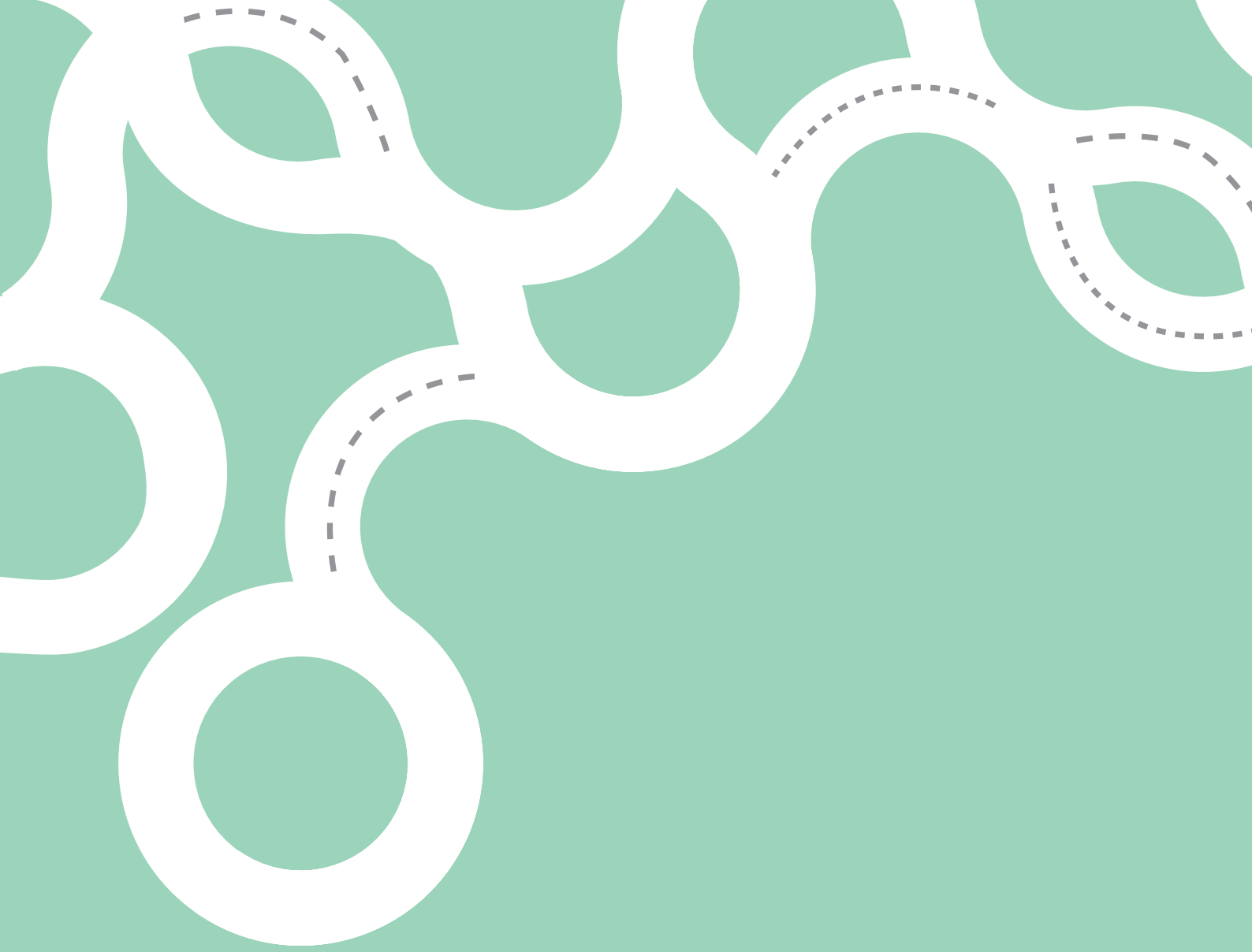
DIRECTORATE GENERAL OF HIGHWAYS, MOTC

2017 Annual Report

Happy highway - Build roads and lead the life to fulfillment

DIRECTORATE GENERAL OF HIGHWAYS, MOTC



2017
Annual Report of Directorate General of Highways, MOTC

Contents

Words from the Director-General

Happy highway - Build roads and lead the life to fulfillment

Each highway contains countless touching stories that carry forward our historical track from decades past up to the present.

Each highway contains endless landscapes and humanities that records various and attractive local cultures.

Each highway has incalculable nameless heroes behind who protect the safety of the never-ending traffic stream along the highway.

Over the years, the Directorate General of Highways has been holding the initial goal, taking road users' perspective as reference and taking the responsibilities of honorable missions with earnest devotion to implement goals and strategic policies which includes "Comprehensive and convenient highway network", "sustainable safe highway environment", "simple-convenient motor vehicle services", and "Quality seamless highway transport for providing the safe roads to home for hard-working and dedicated residents in this country.

In this year, we've been putting effort with earnest devotion to complete all construction projects and achieve outstanding performance, including the "Su'ao to Dong'ao Section of Suhua Highway Improvement project, South-Link Highway Widening Improvement Project, and West Coast Expressway Guanyin to Fonggang Section Construction Project". At the same time, in response to the demands of Forward-Looking Infrastructure, we've subsidized both local governments with road quality enhancement works and building innovative Forward-Looking parking environments are being done to boost regional development. In addition, developing sustainable ecologies along our highways is a major issue also, such as "Landscape Boulevard on Provincial Highway No.3", and "Landscape Boulevard on East Rift Valley Highway of Provincial Highway No.9". They both have been followed by innovative concepts and procedures which take the landscape as the emphasis of the construction and integrate the aspects of local culture, ecological environment, tourism and recreation. In order to provide road users with a new "Downshifting" experience of "No matter how fast the world moves, we still living with our own tempo." In recent years, the number of roadkill accidents of leopard cats and land crabs have occurred frequently. Progressive measures includes intensive monitoring of roadkill accidents, creating passageways for animals, and implementing traffic control. Also, touring roadkill prevention show are expected to raise attention of people to the issues about wildlife conservation, also the traffic safety. We try to achieve the integration between highway and environmental natural ecology and fulfilling the need for eco-friendly and sustainable development.

However, with climate change, extreme weather such as torrential downpours and typhoons have occurred much more frequently. Constantly intensifying our responsive abilities for disaster prevention has been an immediate mission to complete. Except using 3D multi-beam echo-sounding technology to inspect and examine bridge safety, the concept of risk management and river basin management

are also included. For earlier warnings on high-risk hazardous road sections and bridges, those are integrated into the SafeTaiwan APP for ensuring the safety of each road user, and achieving the goals of disaster awareness, prevention, and evacuation.

In the aspect of motor vehicle services, the implementation of each project is based on innovative thoughts and accurate actions, such as the renovation of the road driving test system to intensify drivers' skills and develop safe driving habits. In response to the needs of our aging society, we practice rigorous physical examination and the testing of cognitive function, extending the working age limitation of the drivers of business vehicles, banning those senior citizens who are no longer capable of driving in a competent manner, and reducing the traffic accident rate by caring for senior drivers. Also, in order to prevent tour buses from causing serious traffic accidents and casualties, and to improve traveling safety, the following strategies are implemented, such as rebuilding the motor vehicle administration mechanism, intensifying the safety management responsibility of the traffic companies, establishing a mechanism for banning senior citizens from driving, and strengthening the safety management of tour bus companies.

For promoting public transport enhancement regarding services and functions, several plans have implemented, such as the Highway Public Transport Multiple Enhancement Project for ensuring non-stop services to residents in remote areas, continuous subsidies for bus companies in order to displace old buses and the encouragement of adopting barrier-free and green energy-powered vehicles, application of E-tickets with transit concessions to promote the willingness of taking public transportation and increasing performance; collaborating with local governments in order to implement a demand-responsive transit system to provide a flexible transport service model adapt to different area with multiple possibilities, so as to improve difficult transporting operations as well as inconvenient traffic situations in the remote areas while hoping to satisfy all of the service demands from even the last mile of the road.

Roadworkers are the dream practitioners who link each corner within Taiwan with love and build up the highways with sweat. All of the honorable recognitions over the past one year are contributed by the dedicated and earnest devotion of each highway crew (DHG). In the near future, we'll make each service more innovative and versatile with flexibility, take the general public as the first priority, and create the next whole new page of Taiwan's highway history.

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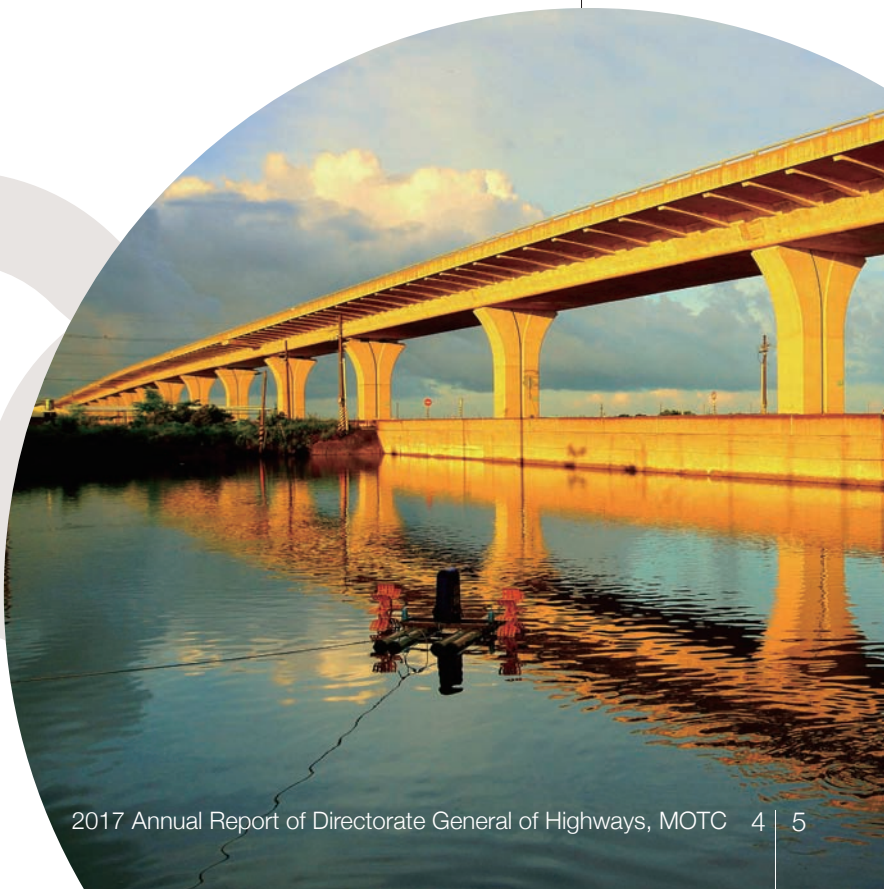
Director-General



Overview

Real Happiness - Promises of safety

The Directorate General of Highways takes “being a happy roadworker”as a self-expectation and takes the responsibilities of creating a safe, convenient, and economic highway network as the mission. Over the past year, roadworkers have fulfilled their promises with perseverance and overcome all difficulties with passion. These achievements made by hard-working and practical contributions can be seen in each corner nationwide, boosting the economic prosperity by leaps as well as presenting outstanding and Excellent performances.

Chapter one

“Realism” is our attitude. The theme of “Barrier-free transportation, greater accessibility” completely describes the efforts made by the Directorate General of Highways for building a comprehensive highway network. For the future, in respect of building a more optimized and convenient highway network promoting the efficiency of inter-regional resource circulation and reducing regional differences, several plans have been implemented, including the “Science City Low-carbon Intellectual Environment Foundation - Partial Plan for Constructing Infrastructure” included within Forward-Looking Infrastructure, the " Road quality enhancement plan(highway system) four-year project” and the “parking problem resolution project”. As to the current progress, the “Su’ao to Dong’ao Section of Suhua Highway Improvement project” will soon open to the public and provide the residents in the eastern area with a safe way home. The “construction of Jishan Bridge re-building and Nan’ao railway crossing improvement” can effectively reduce the traffic impact to the Su'ao and Nan’ao areas after opening the road. In addition, the “South-Link Highway on Provincial Highway No.9 Duoliang to Dazhu section widening construction”, awarded the Carbon Footprint Label Certificate, will be beneficial in establishing carbon management on highways nationwide. Both the “C2-mark, Tunnel of Provincial Highway No.9” and the “WH10-A mark, West Coast Expressway” finished with outstanding construction work which obtained recognition by the Golden Safety Award. Moreover, the “Danjiang Bridge” construction has been initiated and is expected to create transport convenience and a new life in Tamsui.

Chapter two

"Robustness” is our focus on management thinking and is directed by the principle of “Perfection and Everlasting safety” which shares the breakthroughs and innovation created by the highway construction followed by the Directorate

General of Highways. In the aspect of design concepts, no matter whether it is the “Landscape Boulevard on Provincial Highway No.3” or the “Landscape Boulevard of Huatung Highway on Provincial Highway No.9”, all broke through traditional engineering concepts by integrating the local culture with the design. In the aspect of intensifying the bridge inspection and safety management, the utilization of 3D multi-beam echo-sounding measuring technology can precisely detect seriously damaged river beds for early awareness of potential hazards to a bridge. Also, introducing the river bridge management concept with rolling plans for reviewing and modifying the rainfall observation index, and the advanced early warning mechanism of disaster prevention has been recognized by the evaluation of the Transportation Mobilization Preparation and Natural Disaster Prevention and Rescue. Furthermore, not only concerning the road users’ safety, but also reducing the roadkill accidents of land crabs and leopard cats, the Directorate General of Highways has progressively protected the animal’s rights to life by traffic control and educational advocacy.

Chapter three

“Implementation” refers to our determination. We take “Reformation & Renovation, Successful achievement on reducing carbon-dioxide emissions” as our goal and promote quality highway transport services, such as speeding up the displacement of old tour buses for creating a barrier-free bus-riding environment, flexible local management for implementing demand-responsive transit services that satisfy the basic needs of transport in the remote area, intelligent registration systems for advanced campus bus routes services to reduce the rate of traffic accidents caused scooter, intensifying the safety management of the tour bus industry for safer travel, managing traffic congestion-reduction plans during consecutive holidays, providing transit concessions to create a convenient and low-carbon traffic environment, collaborating with the solar power promotion plan by installing solar power generators on the roof floors of public buildings in order to take action for the environmental conservation of our Earth, installation of online e-ticket applications for reducing paper-consumption to help energy-savings, and reduction of carbon emissions also improve the convenience for people.

Chapter four

“Solidarity” is our faith based on “Efficient motor vehicle office, Service attitude concern to residents”. Providing sincere and caring service, practicing small vehicle road driving tests, releasing the working age limitation of business vehicles drivers, managing the program of caring for senior drivers, extending the hours of traffic safety training participated by drunk drivers to make safe driving no longer just a slogan. Replacement of old tour buses and subsidizing the installation of vision-based driver assistance systems on large vehicles to improve driving safety, advanced machine and material control systems for promoting efficient motor vehicle management and reduction of waste, meanwhile, conducting surveys to reflect people’s demands in order to achieve high rating on public satisfaction.

Chapter five

“Integrity” is our promise. Taking the concept of “Transmit smartly, Road information on Cloud system” as the basis, we continue leveling up the quality service: for external aspect, we provide external service for the 24-hour road user hotline, the third-generation motor vehicle and driver information system and SafeTaiwan APP won recognition; for internal aspect, the discipline of the crew got a qualified result on Integrity Evaluation, also, Excellent crews won the honorable award of “Honesty and Integrity” from the Ministry of Transportation and Communications.

Chapter six

“Abundance” refers to our achievement. Utilizing the theme of “Keep initial goal in mind, Reach perfection” to link the topics of the structure of the Directorate General of Highways, administrative project, research and development, competition results, major events, budget execution share the abundant harvest made by our roadworker's perseverance and dedication with the readers.

Realism

Barrier-Free Transportation, Greater Accessibility

Chapter 1

Our devotion and sincerity witness the promises we made toward each and every road user. Hence,we are aiming to build each road to a better life, we've dedicated ourselves on minimizing traveling distance and time. However, carrying the responsibilities of keeping safe roads might seem heavy, we swear to complete with unbreakable promises.

9.7 KM

Su'ao to Dong'ao section of Suhua Highway improvement project" is the first section open to the public in the first stage. The entire length of this route is about 9.7km, asafe road home is expected.

Outlook for Better Future, and Put Effort to Achieve

On Feb. 17th, 2017, the Prime Minister of the Executive Yuan announced the policy of "Expanding Public Infrastructure, balancing the prosperity between urban and rural areas" during giving the 3rd Session of the 9th Administrative Performance report. Since 2017, promoting the "Forward-Looking Infrastructure program" has mainly focused on the fields of railway projects, water environments, green energy, digital infrastructure, and urban-rural constructions.

Three sub-plans – Dedicate to make progress

The special budget of the "Forward-Looking Infrastructure plan" for the 1st stage was approved by the Legislative Yuan and announced by the President on September 13th, 2017. While the Government pays great attention to fulfill this plan, the Directorate General of Highways, MOTC will not save any effort on three of its sub-plans, the 1st: The construction plan for "Smart environmental construction of a low-carbon science city" included in the green energy project as one part of the public infrastructure - the construction of 3 access roads; the 2nd: The construction plan for "road quality improvement" - a 4-year construction plan (road system) for improving road quality; the 3rd: The construction plan for "sufficient parking space" included in the urban-rural project. Both the proposals and Directions for subsidy implementation of the three sub-plans have been finalized, and the results of implementation in the year of 2017 have shown outstanding performance.

Linking - Routes within the Tainan High Speed Rail Special District

First of all, regarding the need for smoother traffic conditions over the road networks in the area of High Speed Raid Tainan Stations, which are located near construction plans for the Greater Tainan Convention and Exhibition Center, Innovative Smart Green Energy Science City, Southern Campus of Academia Sinica, and Tainan Campus of National Chiao Tung University (NCTU). The construction plan for the "Smart environmental construction of a low-carbon science city" included in the green energy project of the Forward-Looking Infrastructure Plan is one part of the public infrastructure - the construction of 3 access roads has been gradually fulfilled by the Directorate General of Highways.

Green ecology Nurturing installation

This plays an essential role in realizing the plan of urban and rural prosperity, and it's included in the Forward-Looking Infrastructure program.

Provincial Highway No.26 at 79K + 100, Mudanwan Park

Provincial Highway No. 3 at 103k, the highway going through the mountain forest

Provincial Highway No. 3 at 103k + 100, Landscape construction of unoccupied open space on the roadside

Provincial Highway No. 3 at 103k + 100, Ecological pond is rich in abundant natural ecology

Also, the feasibility assessment and outsourcing evaluation of the "Tai-tam interchange (bound for High Speed Rail) on Provincial Highway No.86 Widening Project" under the guidance of the Directorate General of Highways has been finalized. The other two construction projects under the guidance of the Tainan City government, the "linking roads between Shalun High Speed Rail Tainan Station and South route No.154" and the "extension of Guiren 13th Road for connecting Guanmiao" are to subsidize the Tainan City government for designing the road network system among the surrounding urban cities including Guanmiao District, Guiren District and Tainan City in hopes of providing more convenient transportation and resulting in boosting the overall economic development of local industries.

Upgrading - Construction Quality in Urban-Rural Roads

Next, regarding the construction plan of "road quality improvement" launched by the collaboration of the Ministry of Transportation and Communication (MOTC) and the Ministry of the Interior (MOI), the MOTC takes charge of road quality improving and overall enhancement of highway systems that is excluded from Urban Planning Projects, and the Directorate General of Highways and MOTC have taken over the task with the "4-year construction plan (road system) for enhancing road quality".

The subsidies are applied to the integrated road quality improement plan proposed by the local government. What is required within the enhancement of highways that are excluded from Urban Planning are "maintenance and renovation of existing highways", "building a green ecology network", "installation of road-friendly facilities", and "embodying urban-rural roads with local culture and landscape". The Directorate General of Highways has obtained the 116 approvals for subsidy construction plans proposed by the respective First Maintenance Office and Second Maintenance Office of the subordinate departments subject to the 16 local governments with TWD 5 billion 255 million (TWD 5,255,000,000) subsidized from the central government. At present, each individual outsourcing process is being undergone gradually.

Improving - Railway Construction and Parking Problems

Third, the "parking problems resolution project" is included in the urban and rural construction. In order to relax parking tension in "park-and-ride Transit between public transportation terminals and parking lots", and the parking problems occurring in "recreational areas with a large amount of visitors", as well as to avoid wasting money on building parking lots that no one would use, the re-arrangement of railways depends on real necessity. At the same time, a coordinated reviewing committee has been created for spotting potential locations for building parking lots.

A variety of advanced measures are ready for service, such as intelligent parking management, guiding information and Electronic Toll Collection Systems, increasing parking spaces share for green-powered electric vehicles, drafting measures to limit the access for two-stroke motorbikes and raising friendlier environmental parking priorities for females, the elders, child-carrying, and physically impaired users, so as to create an innovative and Forward-Looking parking environment.

Su’ao to Dong’ao Section of Suhua Highway Improvement Project - Open Up to the Public by the 2018 Chinese New Year

Su’ao to Dong'ao section of the Suhua Improvement project— Panorama of Baimi Landscape Bridge from Su’ao to Yongyue section

Suhua Highway, a section of Provincial Highway No.9, is the only access road connecting eastern Taiwan with the north region. Its geological structure makes it dreadful to drive through. What’s the worse is, spalling slopes along Suhua Highway are the effects of constantly baring wind erosion, leading to mass landslides battered by storms in Typhoon season and ending up with road closures under safety concerns. Considering its landform-restricted route, cars accidents are reported frequently, which pose a great threat to users driving through this notorious and hazardous section.

Dong’ao Tunnel - One last step away from Completion

Su’ao to Dong'ao section is the first road open to the general public in the Suhua Highway Improvement project, and it has a total length of 9.7km. It was initiated from September 2012, and its Dong'ao to Dongyue section was completed on April 8th 2016, while its Su'ao to Yongyue section was completed on July 17th 2017. During the period of more than 1,900 working days, the highly challenging Dong'ao Tunnel was finally completed by 2018, a safe road home is expected.

During the execution, the crucial “Dong’ao Tunnel” has been suspended many times by vast cave-ins, a total of 33 times includes 13 times north bound and 20 times south bound. Five of these occasions were even flooded by welling water (with the welling speed of more than 1000L per minute). Even though the working progress was extremely delayed

by about 409 days, the construction team devoted themselves to adjust their construction orders, increase more labors, extend working hours, and integrate tests and examinations for speeding up to meet the schedule.

The major structure, asphalt concrete pavement, signs and marking lines of Dong'ao Tunnel are completely done. The controlling systems for engineering and traffic are undergoing the final device installation and testing. To reach the goal of opening the Su'ao to Dong'ao section to the general public by 2018 Chinese New Year, all participating crew have striven very hard to realize their commitment until completing the last section.

Rescuing and Preservation - Blihun Archaeological Site

There's one thing worth to mention, during the construction of the Suhua Improvement Project, the Blihun Archaeological Site was unexpectedly found in March of 2012. Concerning its multi-aspect culture, the abundance of legacies remaining, and the diversity in its phenomenon, Blihun Archaeological Site was certified as a national historic site in July 2015. It took 5 years to accomplish field exploration which covered 4,100 square meters. All excavation work came to an end in September 2017.

For letting people get more familiar with archaeological knowledge, Langyan Museum hosted a special exhibition for not only social educational purposes but representing those efforts put by the Directorate General of Highways for preserving cultural heritages.

Su'ao to Dong'ao section of the Suhua Improvement project — Fire Simulation Test in Dong'ao Tunnel – Fire Pan Test

Su'ao to Dong'ao section of the Suhua Improvement project — Panorama of Bei-Shi Creek Bridge from Dongyue Rd. section, Dong'ao

South-Link Highway of Provincial Highway No.9 Widening Improvement - Dare to Breakthrough

The Follow-Up to the South-Link Highway of Provincial Highway No.9 Widening Project is divided into three sections, includes “Xiang-Lan to southern Jinlun”, “Southern JinLun to DaNiao”, and “AnShuo to TsaoPu”. Among which, the widening improvement on 3 or 4-lane roads will be built over the two sections of “Xiang-Lan to southern Jinlun” and “Southern JinLun to DaNiao”. Bridges as well as tunnels along the “AnShuo to TsaoPu” section are going to be transformed by a route cutoff in order to build a brand-new 4-lane road. A route with a total length of 36.1km will replace the former 40.6km length under the budget of TWD 20.425 billion (TWD 20,425,000,000) with the working period from 2011 to 2020.

C2-Mark Tunnel of Provincial Highway No.9 - Recognized with the Golden Safety Award.

While comparing tunnel building to that of bridges or roads, unpredictable difficulties urge more accurate management over construction risks. Regardless of the challenges from unpredictable factors, the C2-mark tunnel of Provincial Highway No.9 has won and been recognized with the Golden Safety Award in various aspects. First, the excavation of the extended section of the main tunnel takes 3D space and two disturbances construction method. The 3D numerical analysis confirmed the rock convergence and the stable support system and ensured the safe construction without dangers; second, the use of RFID Active Vehicle Control system to confirm the position of the people, vehicles and machines in 24-hour full time monitoring method and the records were stored. Third, the 3D laser scanning technology and circumferential displacement analysis, effective tunnel monitoring about the rock deformation in the surrounding; to conclude, the risk assessment by the organizer as well as the supervision jointly worked with the construction companies showed the safety was taken seriously during the process.

JinLun Bridge

RFID Control System

C2-Mark Tunnel of Provincial Highway No.9 - Reviewing the difficulties

We encountered a bunch of challenges during the schedule of the C2-mark tunnel. Construction progress was often interrupted by restricted working space along with sudden cave-ins or occasional gushing water. Consequently, a few approaches against cave-in emergencies are provided: (1) Before the excavation, the facilitation including probing for geographical forwarding, adopting pipe-roof supporting, TSP-based exploration, RIP on-site exploration, drilling and setting the drain-pipeline, mirror surface-earth heart sprayed concrete pathway and grouting; (2) Partial sections adopted steel woven wire mesh sprayed concrete to replace steel fibers sprayed concrete and properly adding the thickness of sprayed concrete and the grading of steel for effectively promote the supportive strength; additionally, there was a sudden water inrush during the tunnel excavation at the maximum rate of 27 tons/minute; after reviewing, it found that the geological structure was fractured rock mass in the shear-fissure zone with a oblique structure that helped the pooling of groundwater; after the abnormal water inrush, the treatments were implemented to facilitate successful construction, the strategies are the hydro-geological analysis, adopting the research result of "the investigation of rock mass fissure characteristics and the study of preventing water inrush" by Shujing Construction Site, drilling and setting long distance drainage holes that truncates the gushing water at the front site to reduce the water pressure at the rear site during excavation.

Cave-in

Welling water

The Opening of DuoLiang Viaduct and JinLun Bridge - Created quite a lot of highlights

Furthermore, the Provincial Highway No.9 widening project over 412k+350~415k+500 covered from JinLun to DuoLiang in Taitung County. The DuoLiang section was expanded with 2 more lanes on a 1363-meter-long elevated bridge, the DuoLiang Viaduct. As to the JinLun section, a 4-lane orbital road supplements the 1315-meter-long JinLun Bridge, with the farthest span range of 125 meters and the highest pier standing 35.85 meters tall. JinLun Bridge stands out as a feature landmark at the base of its broad span design. By adopting this, the volume of the bridge was substantially reduced, and its

overall dimensions were thus optimized, which makes it would'nt be an obstacle of natural ecosystems. With those achievements reached, the JinLun Bridge has become the specific landscape in JinLun area.

Ever since the grand opening of DuoLiang Viaduct and JinLun Bridge, positive influence on traffic conditions have appeared one after another: allowing greater capacity and quality of traffic volume, reducing the traffic burden from DuoLiang Station, shortening the distance for admiring the stunning east coast, and what's more, elevating South-Link Highway with resistance against disasters.

DuoLiang to Dajhu section Widening Project - Received Carbon Footprint Verification Opinion Statement

Moreover, the B1-mark under the DuoLiang to Dajhu section Widening Project of South-Link Highway of Provincial Highway No.9 have been in service since February 2017. The project was under inspection by monthly basis, and further monitoring of the carbon footprint inventory was preliminary reviewed every March. All the related statistics along with the carbon footprint emission factors had been provided in the performance reports and inventories to verification companies for final review. On behalf of the Directorate General of Highways, the Deputy Director General Hsu Jheng-jhang was represented for awarding on September 5, 2017.

This is the first project awarded with a carbon footprint Verification Opinion Statement in the east area. Installing a regional data base of carbon footprint inventories will be established on the basis of integrating each result of the future project. Further research will be conducted and analyzed regarding the interrelation between the emission volume of carbon and regional features of construction, and firmly back up the domestic construction carbon management system with experiences.

Dajhu section

Awarding Ceremony of Carbon Footprint Inventory

DuoLiang Viaduct

Follow-Up to the West Coast Expressway Continuous Construction Project

Chart of complete extra-dosed Bridge of Yong-an Interchange

In response to the demand of connected land transport from Taipei Harbor to seaside townships and the rapid growth of vehicle trip volume through the West Coast Expressway, with the accomplishment of WH06 to WH08 section of the West Coast Expressway, the WH02 section (mileage 12k-19k), and the TP01 and TP02 access road, vehicles under general genres are open to go straight from Taipei Harbor to connect with Expressway No.66 at Guanyin Township for reducing traffic congestion.

Relieve Traffic Congestion - Yong-an Interchanged Extra-Dosed Bridge

Nevertheless, due to partial completion of the Taoyuan to Hsinchu section, disabled the Expressway with perfect function and lost the original purpose of easing the traffic burden along National Freeway No.1, No.3, and Provincial Highway No.1. Therefore, the construction of an expressway is imperative. The Directorate General of Highways has authorized on measuring, designing, and geological survey of the WH09 and WH10 Guanyin to Fonggang section Building Project. An asymmetry external pre-stressing tendon extra-dosed bridge was planned to build on the intersection of Provincial Highway No.61 and the access road of Yong-An Fishery Harbor (part of County Highway No.144)

County Highway No.144 goes across Yong-An Harbor, Sinwu, Jhongli, Bade, and Yingge, and is the main commuting road with 2-4 lanes on both-directions with 15-20 meters of width between Sinwu and Jhongli. Its west terminal, Yong-An Harbor, is a tourist spot with ported boats, seafood stands and gourmets, allow people feeling of relaxing and a fresh taste along the beach.

Embody Local Features - Create

Inspired by the poetic image “A ship sailing smoothly whilst the wind blowing, catch great amount of fish from somewhere far away”, the bridge towers were built with a structure corresponding to the visual variation triggered by two asymmetrical steel wire ropes. The hidden meaning of birds flying against wind blowing or ships with high sails on their way to waves and challenges would differ from the perspectives depending on which direction users are approaching from. Furthermore, an even more profound intention covering the way the bridge towers point right to the Datan Industrial District extends the expectation of embracing challenges and moving forward. What a perfect combination of matching the overall local construction with a cultural metaphor.

Pursue Top Quality - Golden Safety Award Honorable Mention 10A Section

Led by West Coast Expressway Northern Region Temporary Engineering Office of the Directorate General of Highways, the Guanyin to Fonggang section of the West Coast Expressway was divided into four sections: WH09-A, WH10-A, WH10-B, and WH10-C. The on-site construction of each section was authorized to the 1st Branch and the 2nd Branch of West Coast Expressway Northern Region Temporary Engineering Office for project enforcement as well as supervising.

Since initiating the WH10-A section, the authority has participated in waterway and road clean-up, emergency assistance, and even the worshipping festival. In order to guarantee construction quality and build the best roads, regulations are implemented strictly over concrete proportions, material selection, disk-type support, pre-stress structural members, expansion joints, earthwork, crushed stone grading, AC quality assurance, on-site inspection, base materials, and final products.

Golden Safety Award

Winning a Golden Safety Award in the Public Construction department is beneficial to both transferring outstanding experience and upgrading construction quality.

Transfer Experience - Easier for Future Projects

The construction team dedicated themselves to optimizing every project. Communication over project schedule planning and engaging departments was highly emphasized in advance. Efficient Management toward construction quality and progress, as well as fulfilling on-site safety and monitoring of instant environmental changes are also important tasks during construction. Meanwhile, building up good interactions with the neighborhood area to create a positive image of public construction in the residents' minds and boosting the cohesion of governmental performance of policies to reach beyond what the construction projects were originally designed for.

While operating a construction project, you can’t just simply complete it. With constant persistence regarding site safety and maintaining overall quality, that’s what earns a project its honor. The WH10-A section project, a 2017 Golden Safety Award winner in the Public Construction department, set an example worth following with great construction experiences waiting to be transferred. Besides direct experiences to share, activities like observations of Labor Safety and Health, Orientation training for fresh staff members, and on-site observations were held to maximize the after-influence. Our long-term goal is to witness the overall construction quality reaching its maturity as a wonderful experience from the WH10-A section shaped an advanced level of foundation in construction.

Golden Safety Award Honorable Mention

Danjiang Bridge - Whole New Vision of Living Circle in Tamsui

Simulation chart of Danjiang Bridge

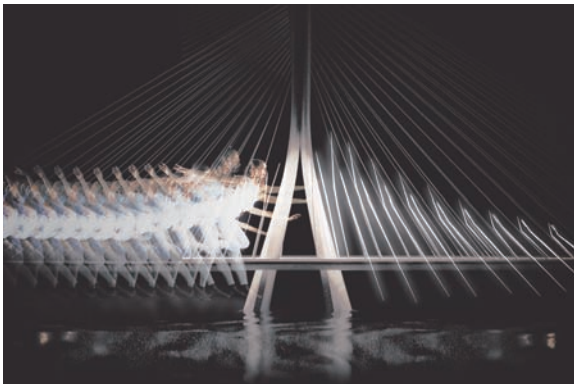
Recently, the rapid flourishing of seaside areas in northern Taiwan has been a proven of Taipei Harbor and Danhai New Town is rising up. The need for a smooth traffic network is required for connecting their neighborhood areas to recreational spots like Tamsui Fisherman's Wharf and The Shihsanhang Museum of Archeology. In response of those demands, improvement projects were proposed actively by the officials. Therefore, Danjiang Bridge and Connecting Roads Construction were built at the mouth of the Tamsui River to link Tamsui and Bali district in order to relieve traffic congestion over the Jhuwei section of Provincial Highway No.2 and Guandu Bridge.

International Competition - Sustainable Ecosystem

The 6km-long DanJiang Bridge project, expected to open in 2020, is planned to be built in three separate tenders with a total budget of NT1.54 billion. The first tender was completed in November 2016. And the second tender, covering 2.4kms from the Bali section and 1.16kms from the Tamsui section, would be accomplished by the first quarter of 2020.

To fulfill the promise of environmental evaluation standards, Danjiang bridge's (Tender 3) profile design proposal was selected from an international competition that intended to invite an international team for the grand construction. Assembled representatives from representatives of government units, domestic, as well as foreign exports, scholars, specialists and artists of local culture to form the Danjiang Bridge Profile Evaluation Committee. In pursuit of the best blending over visual enjoyment and the hidden message – the landmark leads northern Taiwan to a prosperous future. The Committee's mission was to select a design that contains the riverside sunset view, ensuring the sustainable development of the nearby wetland area, and minimizing interference with the environment.

Simulation chart of Danjiang Bridge



Bridge Design Inspiration

The proposal by Sinotech Engineering Consultants, Ltd. and its partner Engineering Consultancy Leonhardt, Andrä und Partner of Germany won the tender. Publication was for the Most favorable bid, but there was no participants came forward to compete from November 2016 until the end of 2017. The bidding process has thus been improved and revised for easier application.

Saving Commuting time through the Community

After completion, it's estimated that the traffic between Tamsui and the northern coastal area, Wugu and Taoyuan, will no longer take the route bound for Guandu Bridge. The total distance will be 15 km shorter, saving about 25 minutes of driving time. At the same time, the traffic congestion on the Chuwei and Guandu Bridge section of Provincial Highway No.2 will be improved. It's an enhancement to the linking access of Tamsui, reduction such as travel time, cost of driving, cost of traffic accidents, as well as air pollution. A lot of physical and invisible economic benefit will be brought to this area. Moreover, it's a great help to the logistics operation at Taipei Harbor. It also distinctly optimizes the northern coast expressway system that shortens the driving time and boosts the development of tourism and recreation.

In response to the "Taipei downtown expressway system developing plan", it forms a complete and time-saving highway network and widens the range of highway services. Besides, with connecting the light rapid transit system, the tourism and recreational activities will be coordinated for better development to rural and urban areas as well as industry. Furthermore, because both sides of the Tamsui River estuary in the Tamsui area and Bali area respectively feature tourism and economic development (as well as traffic transportation with local styles), once the bridge links both sides, the living circles of Bali and Tamsui will be effectively connected into an integrated advantage of building a sustainable rural-urban environment featuring the beauty of natural ecology and traditional heritage.

Danjiang Bridge

The new landmark with both transportation and cost effctive in northern Taiwan

Improve Traffic Congestion Effectively which Occurring on Two Sections Along Provincial Highway No.9

Suhua Highway is the most important connecting road linking Hualian and Taitung with northern Taiwan. Traffic congestion is an inevitable problem on every consecutive holiday. The traffic burden will soon transfer to the Nan-ao railroad crossing section and Su'ao downtown area once the Suhua Improvement open to users. To lower the predictable impact on both areas, reconstruction of Jishan Bridge and building the intersection of the Nan-ao railroad crossing were planned for increasing traffic volume and safety.

Redesign and widening of the intersection of Jishan Bridge

Crossing over the Su'ao Branch line of the north-link railway, Jishan Bridge is the major route linking Su'ao with the neighboring area. The bridge was originally built in 1983 and improved to 17 meters in width later in 1997. ZhongShan Rd. of Provincial Highway No.9, San Ai Rd. of Provincial Highway NO.2-E, and Sugang Rd. intersect toward the arterial road - Jishan Bridge made an N-shaped similar intersection forcing drivers to move with blinded sight and an unexpected route. An Improvement Project was then initiated from October 8th, 2015 and accomplished on September 13th, 2017 with a total budget of NTD130 million. The scope of the nearby route improvement project was approximately 520 meters in total (251 meters on Provincial Highway No.9, 175 meters on Provincial Highway No.2 E, and 94 meters on Sugong Rd.) including widening Jishan Bridge up to 117 meters.

Side-capture photo of Da Nan-ao Bridge

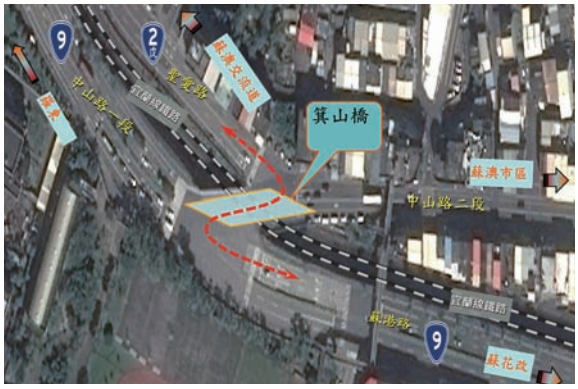
Severe Traffic Congestion caused by the Railroad Crossing Control at Nan-ao

In addition, whenever Chinese New Year comes, Nan-ao street area is always a section crowded with vehicles caused by extra operating trains and endless access control over Nan-ao railroad crossing. According to the official statistics, there are 26 minutes out of an hour was occupied by access control at the peak of the train-passing period from 10am-14pm every day. This severe traffic congestion, often covering 10 or more kilometers, happens in the south-bound lanes at the beginning of the holiday, and over the last few days of the holiday, the south-bound lanes would face the same problem again.

The Nan-ao railroad crossing elevated project relieved the traffic problem

Arguments over whether to have the Nan-ao railroad crossing go up in an elevated style, move underground like subway system, or detour the route by building an orbital road have been discussed constantly. To strike a balance, the Directorate General of Highways and Yilan County Government hosted a conference with the relevant agencies on January 4th, 2013. Agreements were reached to build an elevated bridge over the railway and the construction work started right after the new railway route was finalized. The whole construction region stretches for 1243 meters with the 641-meter-long Da Nan-ao Bridge had being accomplished on September 30th, 2017 with NTD65 billion. Blocking traffic has been eased substantially since its opened.

Aerial Photo of Jishan Bridge



Original chart of Jishan Bridge

Aerial Photo of Nan-ao railroad crossing

Refine to Create a Win-Win

To minimize the impact deriving from fragmented land (affiliated buildings are included) caused by construction projects operated by the Directorate General of Highways, a new regulation – construction planning treatment SOP over fragmented land - became effective from July 1st, 2017. This regulation holds the standardized treatment for problems relating to the expropriation of fragmented lands and secures landownership holders with the rights over land utilities.

Therefore, to avoid potential pleadings happen and shorten the schedule of collecting construction sites, the landownership holder is granted the right of either fragmented land joint expropriation or disjointed expropriation within the construction project accordingly.

From July 1st, 2017 to the end of 2017, the overlay map of the right-of-way range chart, cadastral map, and map of current land use, right-of-way computation over each land plot, and the remaining land amount beyond expropriation, analysis reports of cadastral maps and buildings affiliated with the fragmented lands were provided right after the projects of Recovery Construction on 10k+200, Provincial Highway No.9-A and Shincheng Bridge Improvement on 14k+415, Provincial Highway No.7-D and Rock Shed Improvement Construction of Chukou on Provincial Highway No.18 to maximize the land utility, accelerate the efficiency of expropriation, and reduce pleadings.

Construction Planning Treatment SOP over Fragmented Land

item	Construction office	Project	Target evaluated	Efficiency Report After Adjustments			
				Target adjusted	joint	disjoint	hold
1	First Maintenance Office	Recovery Construction: 10k+200, Provincial Highway No.9-A	28	6	6	0	0
2	Fourth Maintenance Office	Shincheng Bridge improvement Construction: 14k+415, Provincial Highway No.7-D	38	7	3	3	1
3	Fifth Maintenance Office	Rock Shed Improvement Construction: Chukou, Provincial Highway No.18	15	7	0	5	2
Total			81	20	9	8	3

Robustness

Perfection and Everlasting Safety

Chapter 2

No matter on pursuing the perfection of each detail of construction, or giving real-time alerts to the natural disasters, the everlasting desire is to create a convenient transport network, landscape bridges, smooth the traffic stream, and to have a safe environment for all road users going everywhere without any barriers.


More than
40
Km
Landscape
Boulevard of the East Rift
Valley Highway, 40+ kilometers
in its total length, in addition to
reducing the rate of car accidents,
is endowed with an extraordinary
international landscape
highway as well.

Wonderful First Impression – Creation of a Landscape Boulevard on Provincial Highway No.3

Full Blossom of Cherry Blossom at Mileage 69k Provincial Highway No.3

Provincial Highway No.3

The Directorate General of Highways has been giving earnest devotion to fulfilling the mission of "Romantic Kezhuang Landscape Boulevard on Provincial Highway No.3", and expecting all the visitors would have a perfect impression

Embracing romantic Hakka culture via Provincial Highway No.3 was one of the political views proposed by our current President. The Directorate General of Highways has taken over the responsibility of refreshing the overall condition through Daxi to the Shihgang section of Provincial Highway No.3 into a landscape boulevard. Being completed in 2017, its sub-section, within the scope of Emei and Shitan, was upgraded in roadside greening, road flatness and arranged numerous bicycle rest stations for cyclists.

Romantic Provincial Highway No.3 - Glorious Facade Re-Portrayed

Owing to its route stretching through the mountainous areas of western Taiwan, Provincial Highway No.3 is often called the Mountain-looped Highway by residents. Surrounded by hills and tablelands, Mountain-looped Highway is proud of its richness of natural products and cultural characteristics, yet still facing problems of loss in population, offshoring, and shortage of capital. To reform local industry and culture,

the Executive Yuan promoted romantic Hakka culture to Provincial Highway No.3. The North-half of Provincial Highway No.3, its facade, is inherent with charming landscape and a frequent top-3 winner of the Golden Way Award in the department of spectacles. Hsinchu Beipu, Emei, Hengshan and Sanwan were the winners of 2011, 2015, and 2016 respectively. And improvement of Hsinchu Emei and Miaoli Shitan sections were focused first on 2017.

Hsinchu Emei Section - A zone connected by Ecology

Hsinchu Branch of First Maintenance Office concentrated on the Provincial Highway No.3 landscape improvement projects over the mileage 83~93k of Emei Section. More bicycle rest stations were built along the roadside space at 85k+600 and 86k+200, sheet-iron covered bus stops were reformed with nature-bred wooden facilities, concrete guard rails were replaced by see-through steel plates. For preserving water, a novel idea of a rain irrigation garden was built at 86k+200.

Light up the Miaoli Shitan section with its own featured industry

Miaoli Branch of Second Maintenance Office concentrated on the Provincial Highway No.3 landscape improvement projects over the mileage 110~120k Shitan Section. Bamboo facilities were made by local art craft creators to represent the performance of local industrial performance. Spare space was now transformed into a rock terrace field at the entrance of the Xiai Historic Trail as a platform for admiring the countryside view. An eye-catching bus stop was rebuilt featuring local symbols of ponkan mandarin oranges and owls.

Further projects will be planned on the basis of the section to stretch the amount of culture present in Provincial Highway No.3. Making a good impression for people.

Landscape at Mileage 86k+100 Provincial Highway No.3

Mileage 100k+300, Miaoli-Shitan Provincial Highway No.3

Renovartion of Disuse bus stop along Miaoli-Shitan Provincial Highway No.3

Intergrate Landscapes into Scene - A Safe Landscape Boulevard on East Rift Valley Highway of Provincial Highway No.9

Surrounded by mountains and an ocean view, the east coast is one of the treasures of Taiwan. A highway built on the basis of this made it an important intangible asset for our nation. In addition to lowering the risks eastern residents are exposed to and securing accessibility, the benefits brought on tourism the East Rift Valley Highway are imponderable.

Landscape-oriented - A world class Landscape Highway

The East Rift Valley Highway was built on the basis of the landscape. The highway here acts as a way for leading users to admire its beauty. The concept of putting landscape as the priority was a historic breakthrough against normal procedures. With the intention of providing residents with a leisurely life style and a Highway with extraordinary scenery, the authority dedicated itself to details from integrating regional plans to facility improvements, concerning itself with the natural environment without leaving integrity of culture, and most importantly, the mission of equipping isolated areas with better infrastructure and striking greater balance among user safety, natural environment, and a world-famous highway.

Fitting Seasonal Features in Road Design

Themed under “Road Trips with Seasonal Alterations”, visitors are welcome to enjoy a summer-visit to the Sanmin mango tree section of Provincial Highway No.9 in the East Rift Valley. For keeping locally grown mango trees and better traffic conditions during peak season, cars are suggested to distribute themselves in fast lane for go-through purposes and slow land for tourism.

Mileage 283k at Sanmin Dayu Section

Other corresponding policies have been applied according to environmental shifts in each season. Barn swallows are commonly seen hovering over the Highway in spring, to keep harm from both users and the swallows, regional residents set up guiding signs whenever winter comes, tall shrubs and wind forcing whirling gadgets are installed to indicate shifting into escalating flying orbit. To convert its old lifeless image, Creeping Indigo, Feather Cockscomb, Yellow rattlebox, and Agave were planted to fit the well-stacked ears of rice and full-blossomed silver grass in autumn.

Resembling Local Expectations with Innovative Thinking

A sufficient comprehensive overview of regional characteristics facilitating residents to enjoy refreshing experiences upon the season of their visit. We are proud of the breakthrough in constructional thinking which has finally come to a new phase of initiating opportunities on innovation.

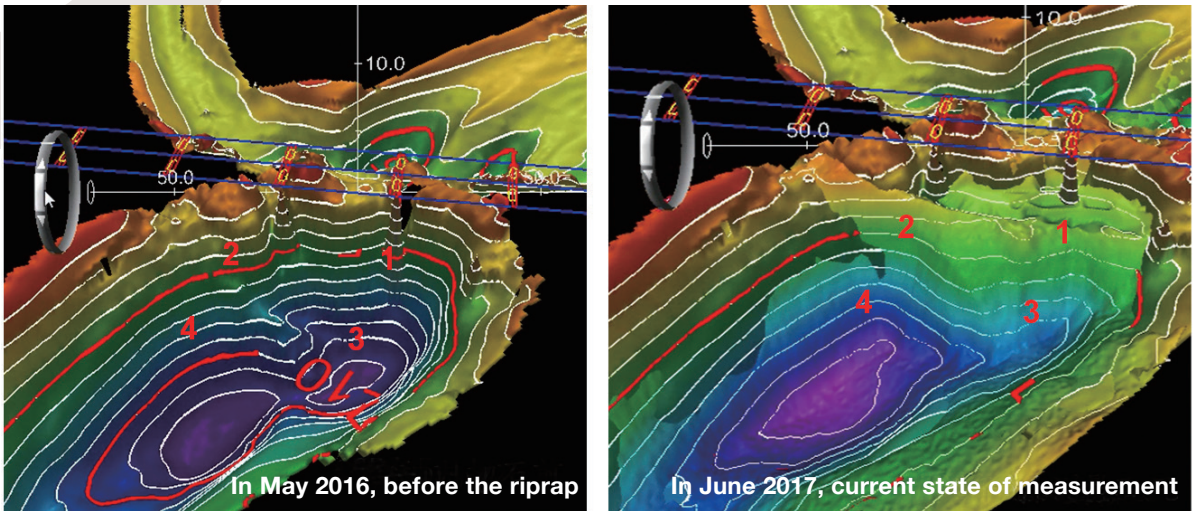
The importance of community acceptance and raising local identity couldn't be ignored in citizen engagement. In the concept forming phase, negotiations and idea-collecting workshops were conducted frequently. In the future, community festivals will be held for the local people and make this way meet closer to the local people's needs and expections.

Simulation aerial photo of Sanmin mango tree section

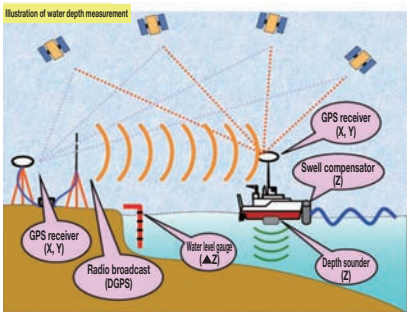
Simulation diagram of barn swallow protecting project on Sanmin mango tree section

Simulation diagram of Luoshan Recreation Area entrance reformation

Control of Accuracy- Application of 3D Multi-Beam Echo-Sounding on River Bed Measuring



Result differences between 2016 (before riprap method applied) and 2017 (3D Multi-beam Echo-Sounding)



Simulation chart of 3D Multi-beam Echo-Sounding

Having jurisdictions over nationwide bridges, the importance of maintenance can be overemphasized, especially river bed erosion and shifts in channels both pose a great threat to bridge structures. Frankly speaking, it's difficult to figure out problems like the stability of river beds and general scouring using conventional vision beneath the surface. Methods like profile leveling were (measure with weights) often applied to acknowledge the real status of river beds under specific segments. However, it's almost impossible to discover the comprehensive appearance of any river bed and thus more uncertainties were uncovered with the safety evaluation and reliability of reinforcement.

Instead of the old measure with Sonar Sounding

Taking the annual profile leveling of Wu Wang Bridges' as an example, the riprap method was adopted to protect its bridge abutment in 2011. Contrary to the official's prediction, the erosion rate had not diminished from 2013-2015. This disappointing result showed the incorrect position against the precise spots facing severe erosion and therefore shrank the function of the riprap. Prof. Lin Cheng, from NCHU, was invited to do a site-survey and recommended adopting the 3D multi-beam echo-sounding method instead.

The 3D multi-beam echo-sounding method sends out signals between the frequency in 200 and 400KHZ respectively. Signals would reflect and transfer into level images according to how powerful the energy is to visualize the river bed characteristics and specific targets once encountering obstructions. With this measure applied, a large scale of river bed information has been obtained and their models were simulated. Management over the dynamic river bed status of either the upstream or downstream segment is easier to conduct, and their shifting history, as well as measuring data, are recorded for future reference.

Precise Measurement secures extra safety

In May 2016, the Directorate General of Highways built a river bed model under the assistance of 3D multi-beam echo-sounding. This model was a crucial reference for reinforcing the severely eroded spots with riprap. The erosion rate had been diminished the second time riprap was adopted in 2017. The employment of 3D multi-beam echo-sounding enables the officials to detect the precise location where severe erosion is happening, improving inspection accuracy, security evaluation and reinforcement reliability, and response immediately against potential danger.

River Bridge Management - Rolling Plans for Reviewing and Improvement

Old thinking methods were discarded and the concept of risk management was introduced ever since 2011. Disaster prevention early alerts were initiated and flow regions had become one of its major concerns.

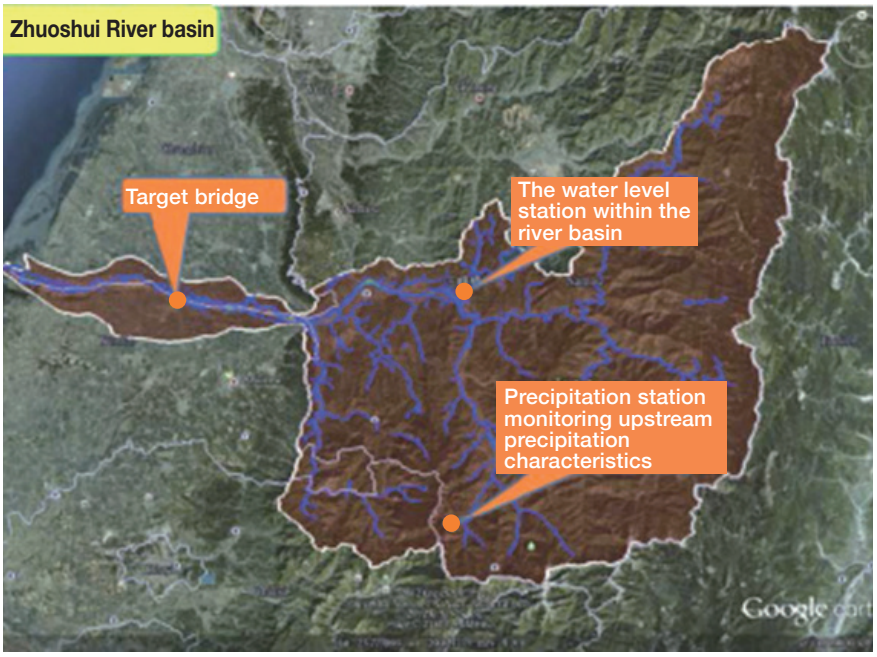
Variations Along Flow Regions Were Ignored Under Previous Managing Systems

The relationship between water stages in flow regions and the amount collected in single-featured upstream rainfall stations were analyzed with the statistics recorded from typhoons. The time difference between upstream water stages and the peak flow volume near a bridge could indicate the water flow time and speed for a sufficient response time.

While most rivers possess a rather wide spreading flow region here in Taiwan, statistics from certain rainfall stations can't represent the overall rainfall distribution and flow path in a rather accurate and objective way. In addition, the preceding management system took only distant downstream peak floods initiated by rainfall from upstream around bridges into consideration, overlooking the potential that nearby rainfall may also be a trigger causing fluctuation toward the flow region.

Launching disaster prevention early warnings & a responsive mechanism supported by detailed rolling computing.

With the knowledge of both potential factors, the gridding diagrams of rainfall distribution were completed on the basis of comparing and revising Quantitative Precipitation Estimates (QPEs) gathered from radar observations and the actual amount from rainfall stations. What's more, the data can be used to compute the average rainfall amount through the whole water region which overcomes the fact of lacking rainfall stations.



A river basin management map demonstrating the single characteristic precipitation

Quantitative Precipitation Estimate, (QPE)

Applying Quantitative Precipitation Estimates (QPEs) to rainfall observations, accelerating the launching of a disaster prevention center

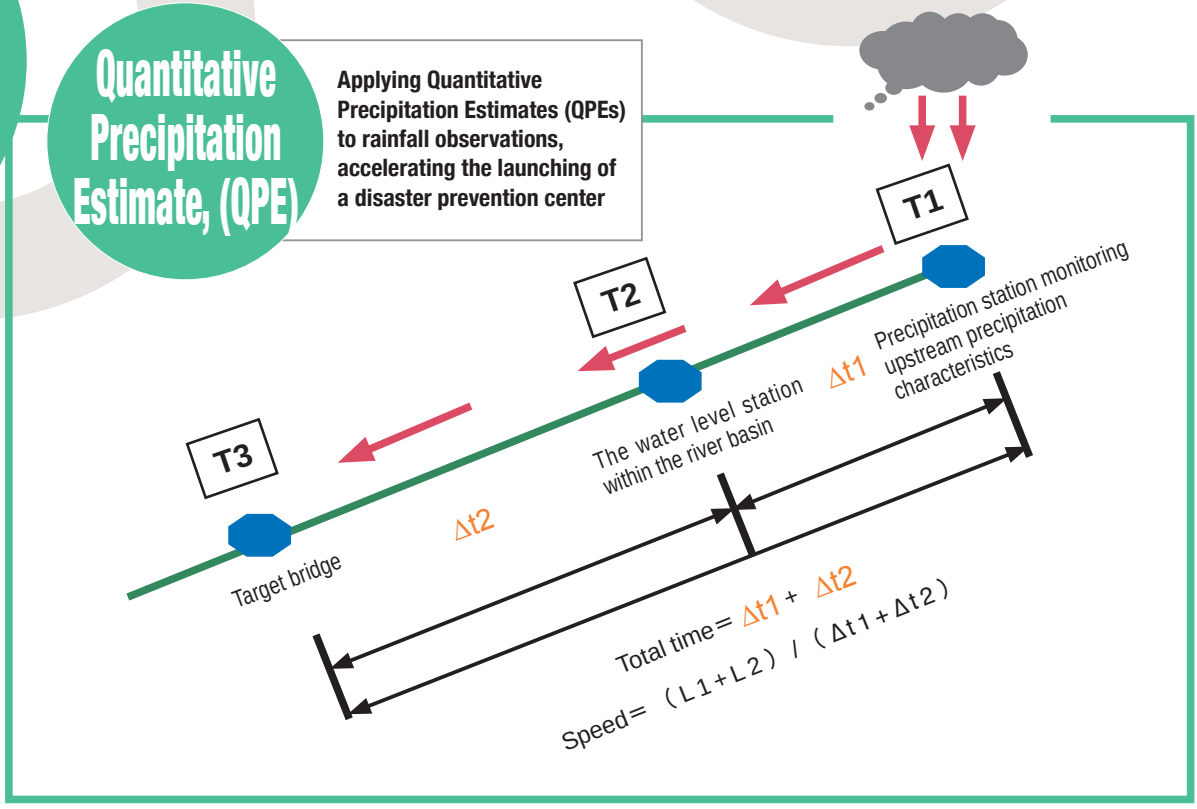
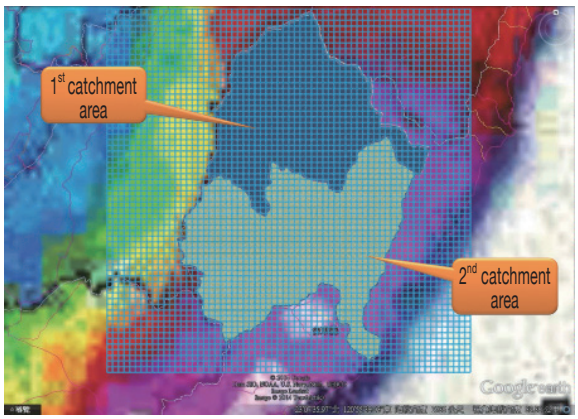


Diagram of management of single-feature rainfall stations



Gridding diagram of accumulated rainfall distribution

As a consequence, drainage basins were divided into several catchment areas on the basis of the catchment area division of the Soil and Water Conservation Bureau for detailed observation of instant water information and predicting the average rainfall by the QPE method. By comparing the threshold value and real-time rainfall within each catchment area, a disaster prevention early warning & responsive mechanism can be launched.

Keep reviewing and improving for explicitly observed values

Aiming at specifying the observed rainfall values in disaster-prone sections in mountainous areas and on bridges, the Directorate General of Highways keeps reviewing and improving measures regarding fierce weather. A trial of management for highway bridge flow regions was carried out from 2016. A gridding diagram of rainfall distribution was completed on the basis of comparing and revising Quantitative Precipitation Estimates, gathering radar observations, and real-time rainfall stations. Drainage basins were divided under the standards of the Soil and Water Conservation Bureau for predicting average rainfall. By comparing the threshold value and water information within each catchment area, observation values could be more precise. Besides, continuing to updated each rolling review after heavy rainfall makes it perfect in every aspect. Related performance reports can be found in the disaster prevention center on the website of the Directorate General of Highways for reference.

Traffic Management Preparation Regarding Preventive Operation of Natural Disasters - Evaluation and Results

awards ceremony on March 20th, 2017

The Ministry of Transportation and Communications hosts a preparation and disaster prevention and response evaluation meeting according to the Executive Yuan mobilization preparation program and Traffic mobilization preparation plan. The annual evaluation focuses on how preparation and disaster prevention and response have been promoted, fulfilled and responded to. Improvements would be recommended based on the results. Officers from the Executive Yuan, Ministry of National Defense were invited as the judges.

Winning First Place in Innovation

Problems and improvements deriving from preparation and disaster prevention and response were expected to be discovered through giving presentations, reviews of documents, on-site examination, and feedback from discussions.

The evaluation program was conducted from December 13th-19th, 2016 targeting the National Communications Commission, Taiwan Area National Freeway Bureau, Fisheries Agency, Council of Agriculture, Taiwan Railways Administration, Bureau of Taiwan High Speed Rail, Maritime and Port Bureau, MOTC, Civil Aeronautics Administration, Construction and Planning Administration, and the Directorate General of Highways.

Items listed in the evaluation included overall promotion results of the year, fulfillment over the budgeting designated to the program, the accuracy of personnel, resources, classification of data, times of lectures, performance of drill rehearsals, creative ways of adding to preparation and disaster prevention and response, adjustments to previous performance.

The judging committee evaluated the targeting departments by the files of self-evaluation, briefing summaries, and overall performance. The results were classified in 5 levels, the Directorate General of Highways was listed at the highest level and came out on top among the target departments.

Fulfilling Rehearsals in fast mobilization

The Directorate General of Highways is responsible for the mobilization of Highways and Vehicles. So far, we have cooperated well with the Tongxin, Ziqiang, and Hankuang exercises in dispatching machines classified under services, supporting military drills, and sending specialized squads to help with emergency road repairs. These missions were perfectly completed. Expected standards set in each disaster prevention and response have also been reached and praised in personnel training, development of warning technology, and integrated information systems.

Real-time weather forecast information provides various levels of disaster warnings to carry out instant responses to any emergency conditions. The Director of the Directorate General of Highways guided promotions in person and praised the efforts made on drills and after-disaster handling. Great dedication was smoothly shown during machine drills and simulations, indicating a team with high coherence and passion.

Preparation and disaster prevention and response lectures 2016

The evaluation results were sent by letter on February 7th, 2017 and the awards ceremony was held on March 20th. We hope that the experience will be kept in mind for better future performance. The result also reminds us to establish systems for self-examination, learning from others, sharing experiences, and taking disaster prevention into consideration.

A Safe Road for Land Crabs and Leopard Cats

The Directorate General of Highways Implementing Ecological Conservation

Road development often results in migration difficulty or roadkill for wild animals in Taiwan. Especially Land Crabs are killed on their way migrating across highways to spawn and the only existing local cat species of leopard cats were posed with the same threat with roads built within their habitats.

Banana bay located on Provincial Highway No.26 is a well-known paradise for doing land crab research. According to the research done by Dr. Liu HungChang in 2009 and 2010, there are 39 species of crabs spanning 7 families found living in shore and creek areas in Kenting National Park. Being Home to 20 species of land crabs, mileage 39.5k to 41.5k of Provincial Highway No.26 (Banana bay to Sa Dao) is known as the habitat with the best biodiversity.

On the other hand, the Wildlife Conservation Act listed the leopard cat as an endangered species since 2008. About 500 land crabs live mainly in front of the mountainous areas near Miaoli, Taichung, and Nantou.

Give Ways to Land Crabs

o lower the impact on the habitats of Land Crabs and Leopard Cats, and reach the goal of building an environmentally-friendly Highway, the Directorate General of Highways managed to place ecological preservation in priority. Land crabs choose evening time in summer as their

A good photo of staff from the Construction Office led by Chen Yan-po, Director of the Directorate General of Highways (6th from left) and Professor Zeng Qing-xian of National Tsing Hua University (5th from left)

Canvas for blocking land crabs from crossing the highway

Rope ladders

peak breeding season and larval release migration, which puts them in great danger of being roadkill. This reality is included under this stage. To keep female land crabs from becoming roadkill, Kenting National Park Administration implemented road accessing control over mileage 39.5k to 41.5k between 6:30 p.m. and 8:30 p.m. from Aug. 6-8, Sept. 5-7, and between 6:00 p.m. and 8:00 p.m. from Oct. 4-6 (Every 15th, 16th, and 17th day in the 7th, 8th, and 9th month of the lunar calendar.) The outside lanes in both directions of the same section will be closed for 10 minutes after 10 minutes of opening to access. A safety car would lead and limit driving speeds to under 30km.

A Pedestrian lane for Crabs beside car lanes

Cooperating with Professor Ceng Qing-xian at National Tsing Hua University for the first time in 2017, we erected a 200-meter long blocking canvas with a smooth surface making it impossible for land crabs to cross to prevent roadkill. In addition, we lead the crabs by their preference of crossing over rough surfaces with built-in rope ladders guiding them to an underpass. Their migrating mission for releasing larva was safely protected with the implementation of this method monitored by 2 web-cameras installed on the entrance of the underpass for better observation. Local residents, as well as those concerned about land crabs, gave recognition to the stunning effect of the move.

Dr. Nozomuwas Nakanishi setting up cameras with staff from ESRI

Experts from Japan sharing lectures in the Directorate General of Highways

Research on the leopard cat - Decreasing the Roadkill rate

For a deeper understanding of the habitat of the leopard cats and decreasing roadkill rate, the Endemic Species Research Institute, ESRI for short, started to conduct environmentally-friendly highway improvement projects in central Taiwan. Despite reconfirming roadkill spots, 13 infrared cameras were installed along Zhuolan of Provincial Highway No.3 and Jiji of Provincial Highway No.3-C respectively. Japanese experts Professor Masako Izawa and Dr. Nozomuwas Nakanishi were invited to share instructions for leopard cat preservation and surveys on decreasing roadkill. They also gave a summary on the current status of Prionailurus in Japan and how they focused on neighborhood road improvement. To make their visit even more perfect, she went to the simulation site and demonstrated the setting of the auto camera and shared efficient capture methods.

An anti-roadkill national tour was promoted in Taichung, Changhua, Nantou, and Miaoli attracting 1500 audience members coming for the performances. Other promotions like “A-Hu in Missions”, hosted by ESRI, were publicized on campus with leopard cat preservation in Taichung, Nantou, and Miaoli. Issues of introducing leopard cats to students and the fact that they are now endangered were brought up in the events held in 6 schools with 500 participants. By educating students with the consciousness of preservation and roadkill-related issues, residents are gradually raising their awareness and support of the issue by changing driving habits and placing more attention on traffic conditions.

Meeting Conference between ESRI and reporters on a roadkill leopard cat

Implementation

Reformation & Renovation, Successful Achievement on Reducing Carbon-Dioxide Emissions

Chapter 3

In order to establish a comprehensive public transportation system, we constantly enhance our nationwide public transport quality services including extending routes to school campuses and remote areas, flexible local management, transit incentives, and replacement of the old for new, so that more people will take public transportation and welcome a low-carbon future!


About
1 billion,
235 million
passengers
The number of passengers of 2017 Highway public transportation

Highway Public Transport Multiple Enhancement Project - Getting Better Gradually

Highway Public Transport Multiple Enhancement Project - Large facilities to bus stations

The Directorate General of Highways has managed the 2017 plan for the “Highway Public Transport Multiple Enhancement Project (2017-2020)” approved by the Executive Yuan, issued under document number 1050035495 on September 12th. The major goals are to promote an additional 0.5% of the total number of passengers transported in 2015 and extend coverage of public transport to 88%.

Strengthening competitiveness - Bottleneck breakthroughs

It’s hoped that on the basis of the existing foundation, the competitiveness of public transport will be boosted faster. Meanwhile, in response to energy-savings and the low-carbon contribution requested by Ministry of Transportation and Communications, public transport will reduce the environmental damages caused by PM2.5 and related air pollution. The total budget for 2017 was TWD 3 billion, 590 million, 812 thousand, after the deduction of flow-back funds of TWD 129 million, 963 thousand. The approved amount is TWD 3 billion, 589 million, 512 thousand, 370 in the management of all plans.

Carrying on the experiences and results of “Highway Public Transport Development Project (2010-2012)” and “Highway Public Transport Enhancement Project (2013-2016)”, integrated public transport is the planning concept. In addition to continuous management of necessary regular measures, all efforts will be put into creating an environment with innovative services. It’s hoped that the service capacity of the public transport can be more competitive in order to compete with the privately-owned transportation or even more superior. It’s hoped to make public transportation become the first option for the people, so that a breakthrough in growth will be fulfilled.

Subsidy to Kaohsiung City Government EcoMobility World Festival

Subsidy to Pingtung County Government Chunri village DRTS bus

In 2017, the major performance achieved the original goal. Public transportation has transported more than 1 billion, 235 million passengers, which is a 1 % increase over the last year and surpassed the original goal of 1 billion, 226 million passengers. The coverage rate of public transport has reached 75.5%, which meets 75% of the goal set for 2017.

Enhancing the service - Replace the old for new

With the collaboration of the Directorate General of highways, local government and the bus companies, all the service routes in remote areas continue operating. Before 2009, due to insufficient subsidies, there were several suspended bus routes. Within four years, about 70 routes were suspended, and people's basic need of transportation was influenced. Since 2010, sufficient funds have been infused. In 2017, 1,247 routes received subsidies with the total amount of TWD 1.25 billion to maintain people's basic needs for transportation.

On the other hand, regarding the aspect of faster replacement of old buses, 277 old buses (including highway buses and city buses) were replaced by the subsidy approved in 2017. The first-priority subsidy was applied to the remote islands, the remote areas in the central and southern regions, or service routes in hopes of promoting the overall riding environment and the service quality, as well as the addition of 16 new bus routes and 61 newly purchased buses. Currently, the average age of buses nationwide has been lowered by 7 years. In 2009, the average age was 10.82. Furthermore, the buses are equipped with the Highway Bus Status Update System that helps to control the updates of the bus and keep a record of traffic accidents.

Welfare for the old and young - Multiple cards are compatible with each other

The promotion of low-floor buses for a barrier-free bus environment provides welfare for old and impaired passengers. It's also the goal of developing public transport. In 2017, with the subsidy, the highway companies and the city bus companies purchased 229 low-floor buses (including large, general barrier-free buses). In 2017, the percentage of low-floor city buses nationwide reached 53.44%. After other subsidized new buses are put into service gradually, the percentage of low-floor city buses will increase in order to constantly provide barrier-free services. Additionally, the bus cards are compatible with each other. Since 2010, more and more buses will be equipped with multiple card inspectors. By the end of December 2017, 77% of the bus passengers in municipal cities were using E-tickets and the rate of general highway bus passengers was 76%. People can use a diversity of E-tickets to take the bus.

277 buses

The number of old buses including highway buses and city buses that were replaced with the subsidy approved by the Directorate General of Highways in 2017.

Adapt to Local Condition - Demand Responsive Transit Service

Over time, the public transport system has never satisfied the service needs of the last mile of remote districts. In order to solve this problem, starting from 2014, the bus routes in the Nangangshan area of Kaohsiung City received the subsidy. Starting from 2015, the city bus routes in Dahu, Yongan, Dashu and Daliao districts were subsidized with a flexible service plan collaborative with taxis during off-peak hours. Among which, the red 70 routes in the Nangangshan area showed obvious growth in their transporting capacity, which is larger than the taxi's. Since July 2014, the regular operation of the route was recovered. This plan has satisfied the people's basic need for transportation, and it also reduced 37% of the costs.

Demand-responsive - Improving transport in remote areas

With this experience, since 2016 the Directorate General of Highways, in response to improving the public transport in remote (aboriginal) areas, has implemented the "Demand-Responsive Transit Services Special Project". With effective and multiple concepts of subsidies, the public transportation service can be provided to remote areas via demand-responsive transit services to meet the real needs of the locals.

There were 12 trial locations receiving the 2017 subsidy for special projects to optimize people's basic service needs for commuting to work and school. And 9 of the trial locations have started operation, including Chunri Township of Pingdong County, Zhuangwei Township of Yilan, Taian township of Miaoli County, Jianshih Township of Hsinchu County, Erlin Township of Changhua County, Hehuanshan Line of Nangtou County, Alishan Township of Chiayi County, Wanrong Township of Kaohsiung County and Yuli Township of Hualian County. Each township adopts multiple operation models and diverse bus types (medium bus, taxi, small bus, rental car or tour bus), and the management is flexible for the development of different operation models. The number of passengers during overall operation reaches more than 36,000.

Subsidized the Miaoli Government to complete the basic transportation to Taian Village

Pingtung Chunri Township DRTS

More than 36 ,000 people

2017 the trial operation performance of passenger capacity

Varying from areas - Promoted transporting capacity

Each location has shown an initial performance. 6 of the bus routes in Chunri Township of Pingtong County are operated by the township office. During peak hours, the buses run in regular routes and schedules (varying from 1-6 schedules). During the off-peak hours, the buses run by telephone registration, and the service is provided by medium buses.

The number of total passenger capacity for 2017 was 1,353. The one route in Taian Township of Miaoli County is operated by the Township office. 6 schedules run during the weekend and holidays (4 schedules on weekdays), and the service is provided by medium buses. The number of total passenger capacity for 2017 was 4,727 people.

One single line in Erlin Township Changhua County is operated by a city bus company. There are 3 schedules on weekdays on regular routes and schedules, and 6 schedules run by registration, and the service is provided by medium buses. The number of total passenger capacity for 2017 was 8,134. There are 2 routes of Hehuanshan Line in Nantou County run by the general highway company. There is one scheduled daily regular route and schedule, with the service during the other hours provided by registration. The service is provided by medium and small buses. During October to December, the total passenger capacity is 4,266. One route in Alishan Chiayi County is operated by a transport company (tour bus). There are 10 schedules daily and the service is provided by medium bus. The number of total passenger capacity in 2017 was 274 people.

Three lines in Yuli Township Hualian County are operated by taxi. There are 8 regular routes and schedules, the other transportation is provided by telephone reservation. The number of total passenger capacity for 2017 was 1,241 people. There are 3 lines in Wanrong Township, and they are run by the Township office with 2-6 regular daily routes and schedules, which are provided by telephone registration. The passenger capacity between June to December is 186 people. Yilan Zhuangwei has one line run by the city bus company which is provided by telephone registration with medium buses. The passenger capacity from July to December 2017 is 55 people.

Additional areas - Extra benefits

In order to keep promoting DRTS, the Directorate General of Highways has planned to implement the system in 2018 in 10 townships and villages including Taitung Green Island Township, Taitung Haiduan Township, Hualian Xiulin township, New Taipei City Pinglin District, Hualian Fenglin Township, Kaohsiung Tianliao District, Pingtung Shizi Township, Pingtung Wutai Township, Tainan Longqu District, Miaoli Shitan Township. The subsidy will be provided to the local government by plans. It's hope to enhance the public transportation in the remote area.

Promote Campus Bus Route and Optimize Service Quality

3.1 million people

Since 2016, the amount of passengers has been raised since the bus service on the campus started.

The Directorate General of Highways started the subsidy on promoting bus services on campuses since 2015. By the end of 2017, 39 schools had joined the plan and passenger capacity has reached 3.1 million people.

Excellent performance - Widely appreciated

Ever since the plan started, students have been guided to use public transportation, and the rate of motorcycle accidents and casualties has decreased to 31% and 34% respectively. This Excellent achievement and relevant measures have won great appreciation from the schools and parents of the students.

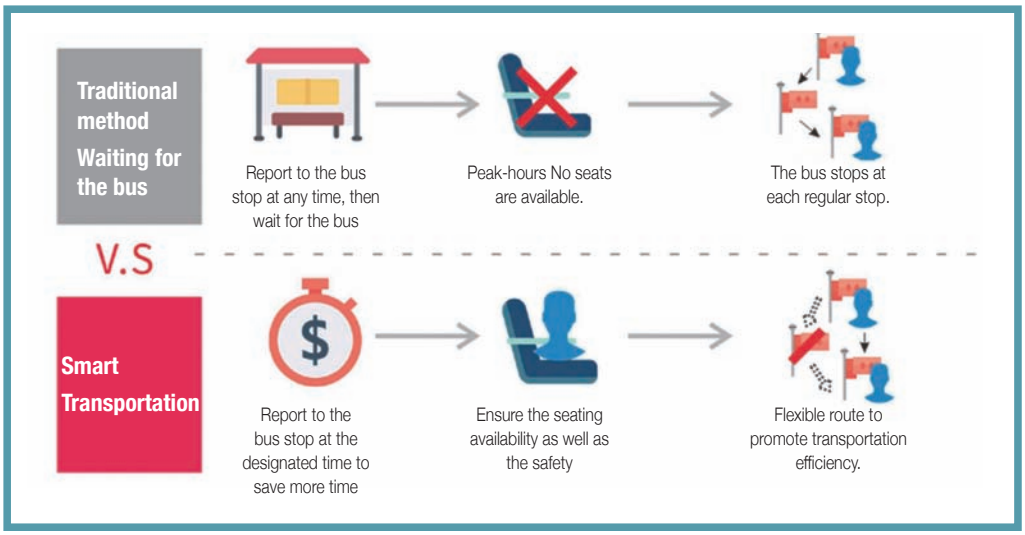
In 2017, in addition to the continuous subsidy on newly planned bus routes, route adjustment, the extra rewards to the performances of increased passenger capacity and reduced number of traffic accients will be provided. In order to provide students with convenient transporting, extended range of services and the proper technology application, an extra subsidy to PT bus and Pingtung University of Science and Technology on facilitating bus services on campuses and intelligent reservation of public transporting service guided by customized system of public transportating operation model.

Utilization of Technology - Convenient matchup

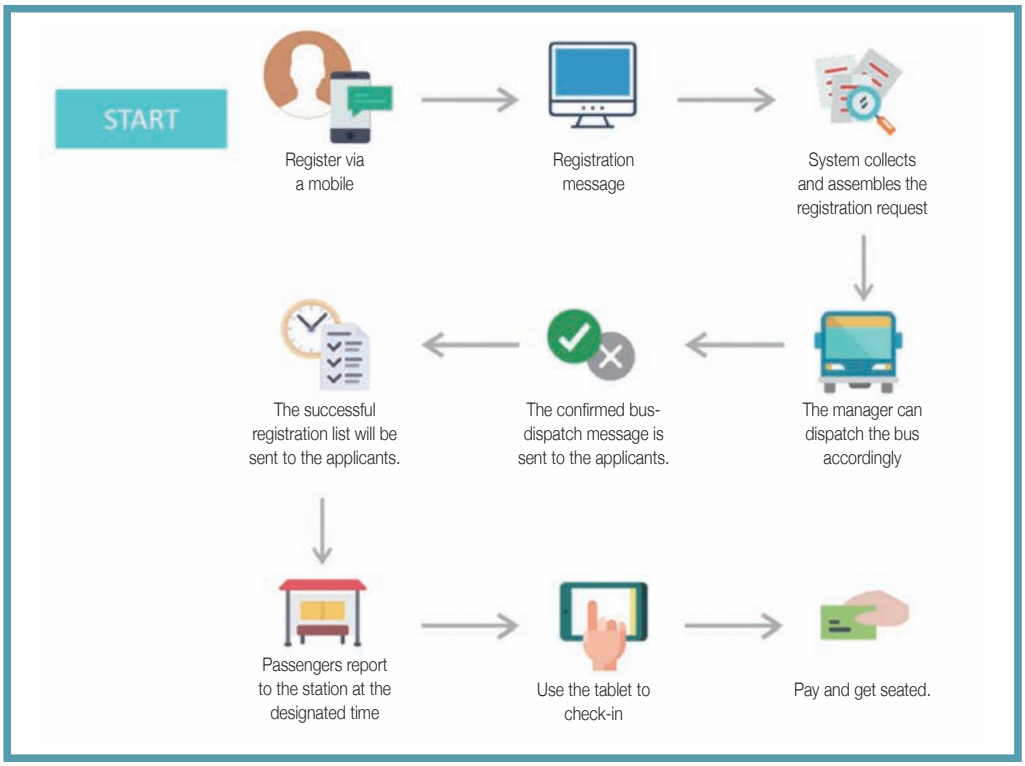
“Smart dispatch transportation system” is integrated with the National Pingtung Technology University Campus APP for student information, so that students can register the bus schedule with the number of people. Then, the dispatch system can plan the best route to make the transportation more effective. The new system is different from the traditional point-to-point dispatching method.

Reducing waiting - Get on the bus without waiting

This dispatch system intensifies the convenience and flexibility of public transportation. After the passengers finish registration, they need to report to the bus stop only at the scheduled time. Students will save a lot of time. In addition, the plan has been applied to buses running in other narrow-road areas. It’s a great help to optimize the traffic effect no matter to the trader or the user.



Comparison of the Traditional method of waiting for the bus and smart transportation



Registration procedures for system users

Eastern (Yihuadong) Region - Overall Implementation of Public Transit Transform Concessions

Using the E-ticket to enjoy YiHuaTung Bus transit concession.

Using the E-ticket to transfer between the highway bus and the local city bus.

Promoting public transportation and developing the habit of using public transportation. Since August 7th 2017, the transit concession has encouraged the public to use E-tickets to get on the train, highway buses, and city buses for easier transit. The Transit concession is an incentive to prevent the public from using private transportation, so that traffic congestion will be reduced. It also responds to the goal of carbon reduction.

Transit Concession - Increasing utilization of public transportation

Due to insufficient public transportation services for satisfying individual needs of travelling, passengers need to transfer in order to reach their destination. In addition to a seamless transit system, the transit concession is also a way to raise the willing of people to take the public transportation.

Extend the service to eastern Taiwan - Better resources allocation

Take the example of a passenger commuting between Yilan and Taipei. By using the e-ticket, they transfer to the city bus after riding the highway bus, there's an NT$15 concession. Within one day, if they take another highway bus, there's an NT$21 concession. The discount is more that 10% offered by the current bus companies. If the passenger bought a paper ticket, the e-ticket can be used as a payment method, so there's a transit concession applicable.

In 2017, after the transit concession was implemented, there were about more than 45,000 people enjoying the concession. And, the transportation capacity has been increased to 4%, which has reached the goal of promoting public transportation and encouraging transit. The Directorate General of Highways will continuously focus on and review the real public application for future concessions to the public transportation transit service.

More than 45,000 people

the average number of people using monthly transfer concession in east area

2017 Transport Management during Blossom Season and Consecutive Holidays – Reduce Traffic Congestion on a Large Scale

Wuling Farm exclusive shuttle bus service

The Directorate General of Highways managed the transport management plan during the consecutive holidays, including the 2017 New Year's Day, Chinese New Year, 228, Tomb Sweeping Day, Dragon Boat Festival and National Day. All the large tourist attractions and festivities held by the local governments were coordinated into the transport management, including traffic reduction measures, public transfer transit concessions, and encouraging the public to "take public transportation more often than driving on your own" in order to achieve convenient transporting of the public and reducing time wasting on traffic congestion.

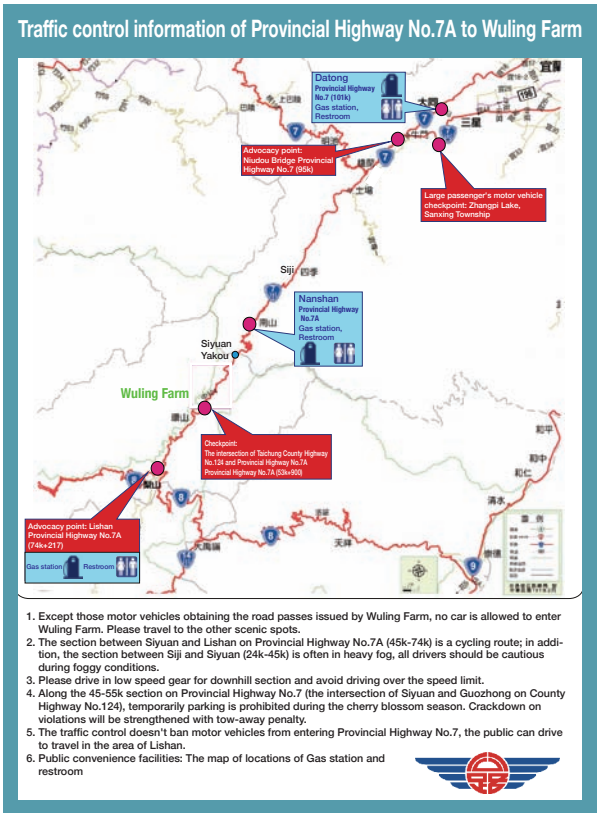
Major Blossom Seasons - Traffic flow rate control

In order to relieve the large amount of traffic at large tourist attractions and traffic flow returning home, the Directorate General of Highways has worked with the relevant unit to plan a transport management plan in hopes of easing the traffic situation. In 2017, the Cherry Blossom season at Wuling Farm lasted 18 days. The Directorate General of Highways has again worked with Wuling Farm, the Yilan County government and the Taichung City Government for the transport management plan. The implementation has four major transport management measures: "site traffic control, road traffic control, group traveler registrations and public transport shuttle service" are provided to the public as multiple and convenient transportation services. This year had great results. The traffic was smooth along the way, and public transportation had 1,225 schedules with a passenger capacity of 44,895 people. The average daily passenger capacity was 2,494 people, which is a bit more than 2016.

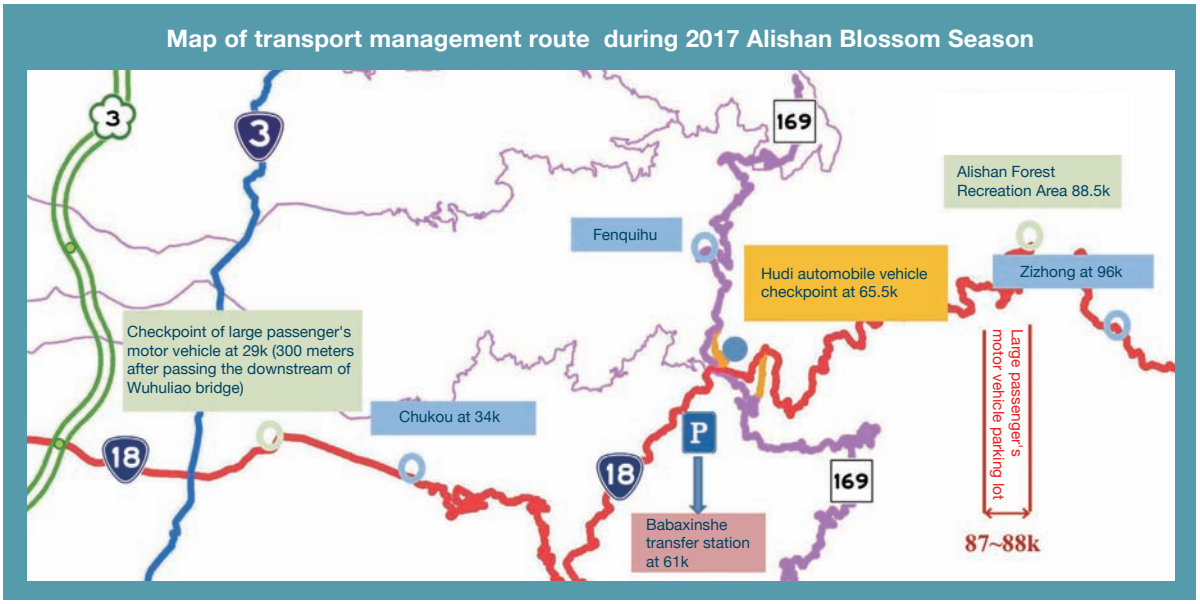
In 2017, the Alishan Blossom season transport management plan was in effect during the weekends of the consecutive holidays of the blossom season and the 10-day Tomb Sweeping Day. The control time period was between 6am and 11am every day. During the control hours, the maximum number was 14,000 people divided into 10,000 people as group travelers. The number of stay-over-night travelers was 2,000 people and the number of individual travelers was 2,000 people. The relevant statistic shows that within the 10 days, the number of travelers entering the site was 116,869 people, and 541 public transport schedules with 21,130 passengers. The transport management plan was successful and effectively relieved the traffic problems brought to the local areas.

Consecutive holidays - Replacement measures

Besides, during the consecutive holidays, including New Year's Day, Chinese New Year, 228, Tomb Sweeping Day, Dragon Boat Festival and National Day, there were 10 replacement roads for congested freeway sections, and all the results reached the goal with an average travel speed of 50km/hr. The travel speed on the expressway is 70-80km/hr. The travel speed on the easy congested road section on the provincial Highway is 30km/hr.



Provincial Highway No.7A to Wuling Farm traffic control information pamphlet



Map of transport management route during 2017 Alishan Blossom Season

Wuling tour bus parking lot

Provincial Highway No.18 at 61K, Baba Hsinshe Transfer site

During the traffic control period, the medium and long-distance highway bus companies have progressively provided extra schedules. Also, in order to encourage the public to take public transportation and relieve the traffic congestion on the highway, the 2017 responsive measures were implemented during consecutive holidays, “Highway bus company ticket price concession and public transportation concession program”. In particular, for the ticket concession on medium and long-distant routes (Taipei to Yilan) as an example, the average concession offer is about a 50 % discount. Also, after transferring between the highway bus or Taiwan railway train, one free concession is applied to the city bus.

Besides the Yilan area, in 2017, during the consecutive holidays the three temporary lines of “MRT Sanchong to Loudong”, “City hall bus transfer terminal to the Chuanyi Culture center” and “Banqiao bus transfer to Luodong (ex-route to Taipei, a direct route service)” will constantly operate. People can use the local bus system such as the “Tourist bus”, red, green line, and Yilan good travel to reach the tourist attractions. Besides, the highway bus companies operating on National Highway No.5 all sell the “joint ticket” Taipei to Hualian, so people can depart from Taipei by taking the highway bus, and then transfer at Luodong and reach Hualian by train.

Regular Implementation - Consecutive-Holiday Concessions Offered for Highway Transport and Local Transit

Five-day National Day holiday National Highway bus ticket concession and the local bus concession

New Year's Day consecutive holiday National Highway bus ticket concession and the local bus concession

The Directorate General of Highways has kept promoting the use of public transportation travel between the north and the south to reduce National Highway congestion during consecutive holidays. In 2017, the regular implementation of the 15% off discount was offered during consecutive holidays and the free concession when transferring to a city bus or a highway bus for 1 section free-of-charge. It's an incentive for the public to plan their trip returning home or when travelling.

Highway bus ticket fare concession - Encourage the use of public transportation

In 2017, during the five-day National Day holidays, a total of 14 bus companies joined the highway bus concession program. The Directorate General of Highways focused on 86 roads for offering discount ticket fares with an average 50% discount. The three trial routes were from "MRT Sanchong to Loudong", "City hall bus transfer terminal to the Chuanyi Culture center" and "Banqiao bus transfer to Luodong (ex-route to Taipei, a direct route service)". In addition, the National Highway No.5 bus priority lane can save at least half an hour of travel time. It's effective for congestion reduction on National Highway No.5.

Local transfer concession - Initial implementation

In addition to the ticket fare discount, the Directorate General of Highways initially implemented the trial during the National Day consecutive holidays by offering the public 86 routes at a discounted rate and giving transfers to the local bus one section free-of-charge. It's a measure to encourage the public to frequently use public transportation and get into the transfer habit. Besides, because the concession offer is limited on e-tickets, the medium and long-distant highway buses will be installed with a ticket inspector machine for better convenience.

Growth in the traffic capacity in the East - Keep going

The National Highway ticket discount and the transit concession offer has brought growth, and especially to the eastern region. The public has been guided to take public transportation and get used to transfers, so that the congestion situation will be reduced. In the future, the relevant measures will be taken to develop the public habit of taking public transportation.

Taiwan Tourist Shuttle Service - A Half-Price Concession Offer During Summer Vacation

The Directorate General of Highways worked with the Tourism Bureau during the 2017 summer vacation for the double benefit activity of the "Taiwan tourist bus" providing shuttle services for tourist purpose. During July 15th to October 15th, whoever used an e-ticket on a Taiwan Tourist bus offer received a 50 % off discount on their purchase of the ticket. And the ticket receipt can be used as a coupon in the shops at the attractions. It's to encourage the public to use public transporting to avoid traffic congestion and better travel quality.

Half price concession - Growth in passenger capacity

Taiwan Tourist bus shuttle service is to connect the major transportation terminals to the major tourist attractions. It's an option for domestic individual travelers to travel with convenience by taking public transportation. Each year, there are more than 3 million passengers taking the service. In order to constantly promote public transportation and green low-carbon travel, in 2017, during the summer vacation, 32 "Taiwan tourist bus" offers 50 % off discount for family and friends traveling by group, and it's hoped to change the habit of driving for travelling.

The Taiwan Tourist bus half-price concession offer is greatly appreciated by the public.

Taking the “Taiwan Tourist Bus” shuttle service can reduce traffic costs and enhance travel safety. It’s also for supporting carbon reduction and energy-saving. In 2017, by expanding the concession to a larger group of people and more routes, there was growth of 310,000 people in passenger capacity (an increase of 25%), effectively increasing the capacity and the development of local tourism.

310,000 people

An increase of passengers from the half-priced concession offer.

e-tickets - Promoting the use of e-tickets

Encouraging people to travel by using e-tickets and low-carbon travel is a major task for the Directorate General of Highways. Using the concession offered for public transportation and tourism, the use of public transportation will be enhanced, and the local tourism development will be promoted. In addition, traffic congestion will be effectively reduced, so that the public will get used to and like to take public transportation and the travel quality will be improved.

During summer vacation people used the e-ticket to travel with the Taiwan Tourist Bus

Summer vacation half-price advertisement flyer of the Taiwan Tourist Bus

Reinforce Safety Management of the Tour Bus Industry

Cooperate with the police inspection, and request for immediate improvement

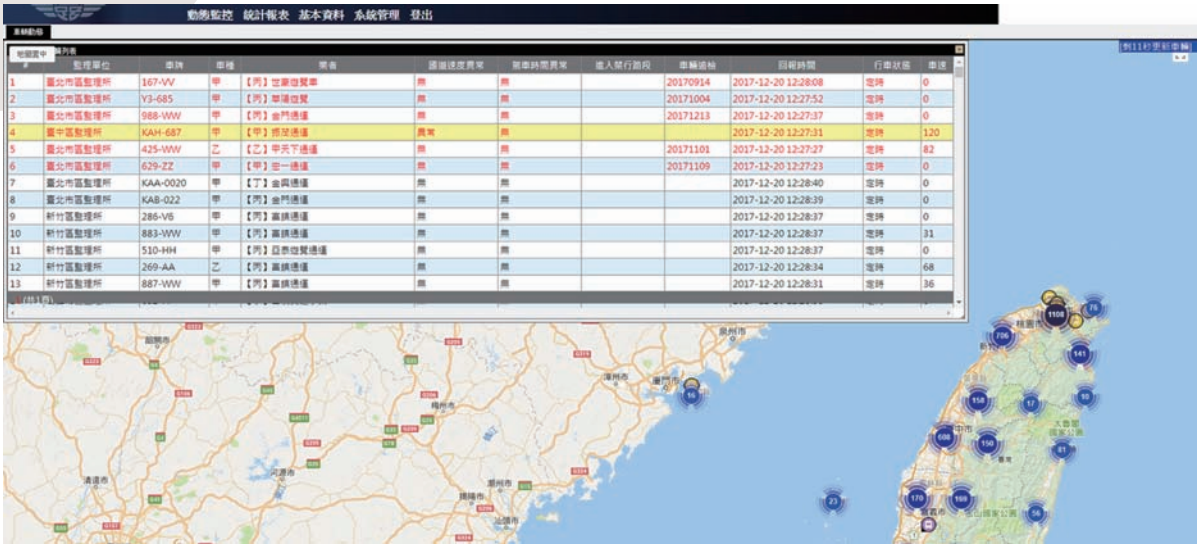
In 2017, a tour bus crashed on National Highway No.5 and caused serious casualties and injuries. Although the justice unit finished the investigation and explained that the accident was caused by personal factors, the Directorate General of Highways considers safety during traveling, and a review of tour buses has been implemented. According to the current law structure, we must intensify the administration supervision mechanism and the early alert system, and establish the driver's safe driving responsibility, while reinforcing the tour bus safety management and comprehensive safety management responsibility. There was an inspection of the company and a consultation with the company in order to self-establish a safety management system and place the safety responsibility under supervision.

Safety management - Intensify supervision

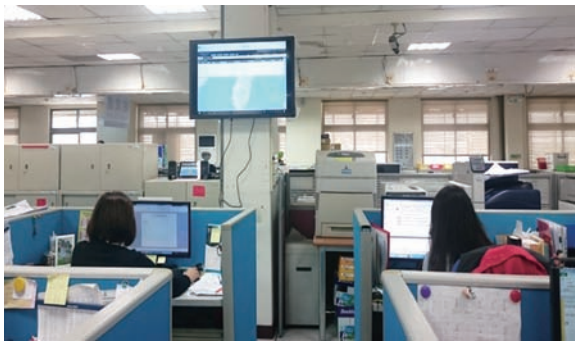
The Directorate General of Highways has rebuilt the administration mechanism, completed the company safety management responsibility, smart motor vehicle equipment and stopped senior drivers from driving. First, to rebuild the administration supervision system, in May 2017, safety inspection regulations were performed on all tour bus companies (927 companies) with 1,715 inspections. Furthermore, the additional inspection regulation was strictly implemented on all unqualified drivers, car inspections, and unqualified tire tread depth to ensure travel safety.

1,715 inspections

The number of inspections performed on tour bus companies.



GPS information platform



Monitoring system - Overall installation

Next, to complete the safety management responsibility of the bus company, in May 2017, the transportation company management regulation requested that all tour buses should be equipped with GPS devices. And to strengthen the company's self-management, all the business vehicles should be equipped with monitoring systems and send the vehicle information back to the information platform. There are 10,053 cars subsidized by the government with GPS installation. Also, 308 sets of monitoring systems have been installed to help the companies with business operations.

Smart equipment - compulsory installation

Also, smart vehicle equipment was installed on 2,712 (77%) of all vehicles by November 2017 with the subsidy. The devices include the anti-crash and lane alert system. The technological devices help remind drivers of their driving conditions. The legislative Yuan has finished the 1st read of the traffic violation law for punishing large tour vehicles without the installation of a smart device. And, starting in 2019, all new large vehicles should be equipped with digital video recording.

Old cars - Stopping them from running on the roads

Also, for the establishment of stopping old vehicles from running on the roads, the motor vehicle supervision division collaborated with the Environmental Protection Administration to stop tour buses aged more that 18 years old (543 buses, 228 have been voided). Now, it's time to plan for the Vehicle restoration for those over 15 years old (according to the new vehicle structure regulations to rebuild the structure) before being continuously used as tour buses.

Rooftop Power Generator - The Installation of Solar Systems on the Roof Floors of Public Buildings

Since the Paris 2015 UN Climate Change Conference (COP21), the development of renewable energy and the use of clean-energy has become a global scale trend and tendency. Our government should take the prospect of energy security, green economy and sustainable environment as realistic visions and consider multiple energy development plans. In particular, implementing a solar energy project fits into the natural environment in our country, as well as responds to the renewable energy applications of our national industrial foundation. It benefits achieving the target of decreasing CO2 emissions, increases the level of energy autonomy, and stabilizes the power supply.

The installation of Implementing a solar energy project can be divided into the roof type and the ground type. In particular, the roof type sets up a solar powered system on the roof using pieces of solar roof tiles, while setting up the rooftop generators on the roof floor of public buildings carries some advantages as stated below:

First of all, there's no need to draft a budget for the construction cost. Simply by providing the roof floors to the suppliers who install the solar generators, as well as manage the operation, maintenance, and sell solar electricity, the National Treasury can collect its profit. That refers to a win-win situation. The second, in addition to activating the national property, those solar panels actually reduce the amount of heat hitting the roof and the inside temperature may reduce 3 degrees Celsius in average, so that the cost of air conditioning inside the building will also be reduced, along with the electricity cost of the public organizations. Moreover, practically implementing energy efficiency and the reduction of carbon dioxide emissions, establishing installation models that drive non-governmental installation, and enhance the opportunity of national green energy businesses and employment are beneficial to spread solar system installation nationwide. As a result, the government has listed rooftop solar power generators as an important part of the "Two-year Solar Power promotion Plan".

The current scene of rooftop power generators installation on the roof floor of the Southern Training Center of the Training Institute

The Directorate General of Highways is actively cooperate with the implementation of solar power plan. In 2016, a total of 370 roof floors of public buildings were inspected, and the Bureau of Energy, Ministry of Economic Affairs selected a total of 126 roof floors as good locations for “setting up rooftop generators”. Given that this is a new policy, there’s no other relevant experience in recent. In February 2017, the government called for associate units to roll out the implementing strategies and directions of assisting solving the related problems and concerns. Until August 2017, a total of 61 buildings had successfully outsourced for the installation, and another 65 buildings had conducted about 2-7 times of outsourcing or rental proposals, but no supplier joined the bidding. Those 61 buildings are undergoing parallel operation to be completed by the bidders within one year in accordance with the agreement. It’s estimated that by the end of June 2018, the “rooftop generator” system will be complete, and there will be an estimated 3,000 KW generated. The profit from selling electricity will be given as income to the National Treasury.

Joining the plan of “Rooftop Power Generators” is the way that the Directorate General of Highways takes action to show love to the earth and save the earth. It’s expected to contribute efforts to the prospect of energy security, green economy, and a sustainable environment.

3,000kw

It’s the estimated total power generated by the Directorate General of highways in the middle of 2018 in response to the Rooftop Power Generator plan.

Setting up solar power panels on the roof

The current scene status of Rooftop Power Generators on the roof floor of the Third Maintenance Office.

An inverter and a meter for solar powered equipment

More Efficient Energy-Saving and Carbon Reduction - Digital Temporary Access

According to the Road Safety Regulation No.80 to 84, when a vehicle transporting an over-weight container or one-piece object or dynamic machinery or any dangerous objects on the road, it must apply for a temporary road use permit in accordance with the regulations by submitting related documents to the local motor vehicle office in the departure point or to the location of vehicle registration before using the road. According to the practical procedures, the owner of the shipment or the transporting company should prepare large amount of paper documents related to different kinds of road use permit respectively and submit the document to administrative organizations, such as the motor vehicle office or the authority of road to get the temporary road use permit issued.

To simplify the burden to the companies and the inspection personnel, the Directorate General of Highways has implemented an online application system since November 2016 and simplify the process for small trucks loaded with liquid natural gas. All units were notified by official documents on December 31st, 2017 to properly use and promote the system.

Besides, to strengthen the using rate and the E-Government Construction Plan, in addition to the online application system, mobile or other digital products can be used to download the inspection QRcode. There's no need to get a paper permit from the local motor vehicle office. It's more energy saving and more convenient for companies.

Backstage management step 1

Backstage management step 2

Backstage management step 3

Solidarity

Efficient motor vehicle office, Service attitude concern to residents

Chapter 4

In recent years, we've constantly pursued better service quality in motor vehicle administration by the means of not only perfecting the comprehensive information service network, but also simplifying the operation procedures, as well as integrating related operations. Meanwhile, the renovation of testing and licensing of driver management is expected to reduce traffic accidents and achieve the best benefit for the general public.

95.5%

In 2017, there were 95.5% of the general public sharing a good experience with the overall service quality provided in the 7 motor vehicle offices and 30 stations affiliated with the Directorate General of Highways.

“Small Vehicle Road Driving Test Policy” has Officially Hit the Road

Part of the driver’s road test- complying with traffic lights while driving

With the evolution of life and technology, traffic density and complexity are also leveling up. In developed countries, the driving test consists of a road test. As a result, a road test will definitely be implemented in the renovation of the driving test system.

Driver’s road test - Road safety on the way

Taking reference from the 2015 analysis data released by the Ministry of the Interior Police Administration, the number of causalities per 100,000 people in traffic accidents (within 30 days) is 13.2 people, which is higher than a number of developed countries, such as Germany, Japan, the UK and the US (Japan is 4.0 people). The Directorate General of Highways and Ministry of Transportation and Communications have taken the policy rooted on “decreasing the number of causalities in traffic accidents” via introducing the auto driving test site, which has been used since 1974 until now.

For promoting the road driving techniques and intensifying the goal of safety traffic, since May 1st 2017, the “road driving test”, which is also called the “road test”, has officially practiced. Through the renovation of the driver’s road test system and the implementation of practical training in the driving schools, there are more drivers complying with the traffic regulations and developing the habit of safe driving.

Practical application - Decreasing the traffic law violations

The driver’s road test statistics collected from May 1st, 2017 to December 31st, 2017 shows that a total of 160,000 people took the driver’s road test. With consultation from the motor vehicle offices and the contributions made by 214 driving schools nationwide, a large amount of effort has been put into intensifying the driving techniques, actual

A group photo of the representative of each unit when participating in the demonstration

Part of the driver's road test pre-check before driving

Actual driver's road test

road driving and responses to traffic conditions, the development of traffic concepts and morality, etc. The qualification rate has increased from 66% at the initial stage to 75%, which is only slightly lower than the qualification rate of 78% in 2016. Moreover, for people who have taken the training course at the driving schools, within one month after they got their driver's license, their rate of traffic law violations has decreased from the 1.9% during June~September 2016 and the 1.82% is average rate in 2016 to 1.75% during January~May in 2017 and 1.66% during June~September after the new driver's road test system started. There was a 13% decrease at the same period of time. The rate of traffic law violations has gradually decreased, and safe traffic has also been continuously improving!

Being dared to international standards - Integrated testing and training

The Ministry of Transportation and Communications and the Directorate General of Highways strongly insist on the importance of traffic safety. No matter how hard difficult it will be, we believe in keep our faith, progressive assistance, listening to people's opinions, resolutions to problems and the establishment of supporting measures to smooth out the execution of policy. Reversing the half-century old historical driver's testing system to adapt to international standard! Implementing the integration of testing and training ensures the general public will develop essential driving techniques, concepts, morality, habits and peace when driving on the highway!

160,000 people

With consultations from motor vehicle offices and the contributions made by 214 driving schools nationwide, the driver's road test statistics show that during May 1st to December 31st, 2017, there has 160,000 people been participating the road test.

Extending the Working Age Limitation of the Business Vehicles Drivers Up to 70 Years Old

In these years, there have been a lot of different opinions about whether to extend the working age limitation of business vehicles drivers. The Taxi Drivers' Association and the Commercial Business Association have presented their petition in the hope that the Directorate General of Highways can consider their member's livinghood and financial needs and take foreign systems as reference to release the working age limitation for those taxi drivers who are still in good physical condition.

International regulations - On the basis of physical condition

Considering the international tendency toward population aging and delaying retirement, as response to the social needs of the aged society, the Directorate General of Highways has taken the relevant experiences from other countries and collected information about the working age limitations of taxi drivers worldwide. The fact is that most regulations are based on the personal physical condition as the reference of issuing the business license.

In August 2013, the Directorate General of Highways entrusted a professional opinion poll company to do further research, and the facts show that the statistics of agreeing and disagreeing are almost the same. According to the 2015 "analysis of taxi traffic accidents on the roads" released by the Directorate General of Highways, the facts show the taxi drivers more than age of 65 are not the group of causing the most traffic accidents.

Agree to release the limitation - More rigorous regulations

For better consideration, the Drivers' Medical Consultation Council, Ministry of Transportation and Communications had several discussions in the Board of Committee conference, and the final decision made in the 11th Conference of the Board of Committee agreed to a more rigorous physical examination of the taxi drivers aged more that 60 years old as the supporting measure to extending the working age of taxi drivers up to 70 years old. And the supporting measures consist of physical examination items, driver's cognitive function test, as well as activating the status updating mechanism when the taxi driver is the first party of the traffic accident.

Drivers' welfare - Taking the traffic safety into account

Since April 1st, 2017, the drivers of business vehicles should take a more rigorous physical examination and a drivers' cognitive function test when turning 68. Once qualified, a drivers' license with one-year validity will be issued. In addition, due to the extend of the limitation of the driver's age, the management mechanism should include a physical examination and real-time monitoring of people with or without dementia to fulfill both concerns about the living cost of the drivers of business vehicles and the traffic safety on the public highways.

The statistics showed that there are 58 qualified hospitals nationwide that can manage the physical evaluation until the end of November 2017, and there are 1,662 people getting qualified in the cognitive test. Among which, 1,606 people were qualified to obtain their driving license for a business vehicle. The new measure has benefited the drivers who need to continue their driving business.

Promoting the Advocacy of the "Senior Driver's Caring Program"

In view that our country has become an aging society, progressive care for senior citizens about their driving safety has been initiated by the Directorate General of Highways via the "Senior driver's caring program".

Caring for seniors - Enhance the senior citizens' safety on the roads

By the mechanism of physical examination and cognitive testing, senior drivers have the opportunities to understand whether their health conditions are suitable for driving vehicles. Also, their family can take the results as the opportunity to persuade people who are no longer suitable for driving vehicles. And it's a great way to attract people's attention to senior citizens' safety on the roads.

In order to deliver the government's sincere concern about senior drivers, there's an exclusively-made commemorative e-ticket containing TWD 200 credits which will be gifted to the first batch of senior citizens who are willing to return their driver's licenses. The motor vehicle offices also provide free-of-charge concessions to the senior drivers who replace their driver's license. The concession time period started from the end of 2017 and will be extended to the end of 2018 in hopes of reducing the partial burden of the public.

Step-by-step advocation - Reducing the rate of traffic accidents caused by senior drivers

Furthermore, according to the statistics released by the Ministry of Interior Police Administration, we use the example of the A1 type traffic accidents during July to November of 2016 and 2017 caused by a 1st party who is aged more than 75 years old (casualties in A1 accidents caused by people aged more than 75 years old/the total casualties in the traffic accidents) and divide it into two parts, cars and motorcycles. The result shows a distinctive decrease after the implementation of the "senior driver's caring program". In the future, the Directorate General of Highways will integrate relevant advocation for constantly reducing the rate of traffic accidents caused by seniors.

Statistics of A1 accidents caused by people aged more than 75 years old

Time	Motorcycles		Cars	
	Casualties in the accidents caused by seniors / Total casualties in traffic accidents	Rate of traffic accidents caused seniors	Casualties in the accidents caused by the seniors / total casualties in the traffic accidents	Rate of traffic accidents caused seniors
July to November, 2016	41/283	14.5%	5/162	3.1%
July to November, 2017	27/261	↓ 10.3%	2/164	↓ 1.2%

Senior drivers take the cognitive test in our institute

Senior drivers replace their driver's licenses

Drunk Driving Violation – Raise Awareness for Life

All the time, the warning sign of "Drinking without driving, and driving without drinking" has been a reminder for every driver. However, traffic accidents caused by drunk driving keep happening frequently.

New regulations kick off - New traffic training regulations regarding drunk driving

In order to effectively reduce the troublesome drunk-driving violation, since March 1st, 2017, the Directorate General of Highways has thoroughly implemented the 6-hour "drunk-driving violation training" and the 12-hour "drunk-driving recidivism special training". The new drunk-driving training sessions have been modified completely. First, the training hours of "drunk-driving violation training" have been extended to 6 hours, while the 6-hour "drunk-driving recidivism special training" has been extended to 12 hours. The basic contents include the emphasis of life education and legal responsibilities, as well as the effects of alcohol on health, relevant education, prevention and treatment of alcohol addiction. As to the "drunk-driving recidivism special training", there are additional contents including examples of quitting alcohol and on-site practical educational training at designated locations.

In particular, the additional life-education impact included the "drunk-driving recidivism special training" is an on-site education training conducted at the Genesis Social Welfare Foundation. The participants could use the vertical wheelchair exclusively for the paralyzed people to experience the constraint feeling, also they will meet those casualties in the traffic accidents and their family members. By experiencing these impacts, we hope that the training effect will be intensified to correct the behaviors of drunk-driving violations.

The class teaching the influence of alcohol on the human body and health

On-site training conducted by visiting (Genesis Social Welfare Foundation).

Drunk-driving recidivism - Life-education impact

The designated on-site education locations include the Genesis Social Welfare Foundation, detention centers, prisons, as well as the motor vehicle office. On the other hand, from the survey conducted among those who participated in the training, their comments indicated that the doctors and nursing staff employed to conduct the drunk-driving life education and the examples of quitting alcohol addiction obtained great appreciation for their professional demonstrations and explanations that made the participants become well aware of their health condition and the influences of drinking alcohol, as well as improving their drunk-driving behavior.

Especially the additional life-education impact, experiencing the vertical wheelchair exclusively designed for paralyzed people and the constrained feeling made a participant whose last name is Chen and had three drunk driving violations exclaimed, “There won’t be a next time!” Some people usually take risks to drive home after drinking alcohol. In case of traffic accidents, there will be two families suffering. It’s a strong reminder to the public, never drive drunk. In the case of drinking alcohol, taking a taxi home or asking for family members’ help to get home are the way to show respect to not only other people but also yourself.

Great appreciation - Effectively reduce recidivism

The participants have to attend on time. Whoever has no approved reasons to absence from the training every time, otherwise 1,800 NTD fine will be charged. Whoever is absent from the training 6 months after getting the notification will be punished by a 6 months driver's license suspension.

Currently, most participants gave great appreciation to the training, especially to the videos filming the victim’s family member’s feelings. Their empathy has been raised to think about what terrifying results may happen because of their behaviors. The training conducted by visual and audio stimulations shows instinctive positive effect to correct the behaviors of the participants by not only making them have more concentrated attention, but also deeply review the mistakes they made for effectively reducing the recidivism. Great improvements have shown by the reduction of the number of deaths caused by traffic accidents, and great benefits have helped to build a friendly traffic environment.

6 months

All the participants of the “drunk-driving recidivism special training” should attend every training sessions unless having approved reasons, otherwise there is 1,800 NTD fine to be charged. Whoever is absent from the training for 6 months after getting the notification will be punished by a 6 months driver's license suspension.

Displacement of Old Tour Buses - Enhancing Travel Safety

On February 13th, 2017, a serious tour bus traffic accident resulted from a tour bus which was produced before June 30, 1999. The bus was following the laws and regulations regarding the safety inspection of large tour buses in Taiwan that never include the inspection of stability and structure. The public opinions over the flaws have made the Directorate General of Highways start to review the laws and regulations regarding the safety of large vehicles. And, the feasibility of the new regulation was analyzed by means of comparing the differences in different years, classifications and groupings.

Holding Forums - Welcoming opinions from all aspects

The Directorate General of Highways held four forums in the morning and afternoon sessions on March 10th, 14th, and 22nd, 2017. Many experts from all aspects were invited to the events, included specialist and scholars of vehicles and traffic management, companies of the union, Tourism Bureau and Association of Travel Agents. The discussions were over the differences of laws and regulations, the limitations of tour bus utilization and the replacement issues. For speeding up the displacement of the tour buses produced before June 30th 1999, the Directorate General of Highways adopted the “subsidy plan of replacing old diesel buses” which has announced by the Environmental Protection Administration, Executive Yuan on August 16th, 2017 as the economic incentive.

Inspect the structure of the vehicles - Speed up the replacement of old vehicles

In addition, there are other relevant administrative measures including the overall inspection of the existence of the vehicles, progressive caring service by visiting tour companies, more inspection times and items, and reinforcement of auditing.The Directorate General of Highways has commanded all the motor vehicle supervision units to execute the new inspections from November 1st, 2017 until December 10th, 2019. As to the amendments of the speed limitations, road control, and transforming tours buses into shuttle buses have been reported to the Ministry of Transportation and Communications for approval on November 9th, 2017.

Extending the life of the buses - Promoting the transformation of tour buses into shuttle buses

In view of the suggestion proposed in our country about extending the life of the buses, the principle of Hong Kong's COF system and the current situation of the installation of buses in our county are taken as references. The draft tends to extend the life of the bus by 2 years subject to overall inspection and maintenance when the bus is driven for 15 years. If the chassis of the bus is replaced, the life of the bus can be extended 5 years. If the bus will no longer be used as a tour bus after extending its life, the bus can be transformed into a shuttle bus, so that the travel safety will be secure.

A tour bus is undergoing an inspection at the motor vehicle station

Installation of Vision-Based Driver Assistance Systems on Large Vehicles - First-Priority Subsidy

Visual blind spot

Due to our lands being densely populated, by the end of December 2017, the total number of large vehicles was about 200,000. In addition, owing to most of the public using motorcycles as transportation tools, the situation of motorcycles running with large vehicles are common. Many car accidents were caused by the blind spots when a large vehicle was making a turn. Also, the large difference of radius between inner wheels often causes serious car accidents by trapping the motorcycles or motorcyclists into the tire of the large vehicles. The traffic safety is seriously influenced.

Video monitoring upon driving - The solution to blind spots

Regarding the blind spot problems of large vehicles, the Ministry of Transportation and Communications makes reference to the safety technological evolution in the planning of the safety equipment on buses by utilizing video devices. The new regulations require all large vehicles produced after 2018 to be equipped with vision-based driving assistance devices. Also, all the vehicles will be requested to complete the same installation before January 1st, 2020. And the devices will be included into the inspection list.

Reverse Visual assistance kit - Promote better safety on the roads

The visible range provided by the vision-based driver assistance system should include the images of both sides and the reverse. The focus is to provide more complete visual information to drivers and reduce the blind spots occurring on large vehicles, especially on the rear side. Drivers with more complete information of the traffic situation behind the cars can better ensure the safety upon reversing.

Subsidy to the visual assistance system - An incentive to the installation

To all the existing large vehicles, the Directorate General of Highways encourages the installation of a visual assistance system for better driving safety. On October 23rd, 2017, the "subsidy plan for installing visual assistance systems on the existing medium and large vehicles by the Directorate General of Highways, Ministry of Transportation and Communications" was implemented. The first subsidy provided to 5,000 large vehicles will be first open to large vehicles having international port permits, as well as tour buses. The earliest 2,000 vehicles finishing the installation will be subsidized with full cost. The follow-up 3,000 vehicles will get 80% of the cost, however, the public city buses, highway buses, large vehicles affiliated to government organizations and government-owned business cannot apply for the subsidy. This is a subsidy plan exclusively provided to encourage the owners of the vehicles to enhance driving safety as well as responding to the goal of government policy.

Difference of Radius Between Inner Wheels

Vision-based driver assistance system for large motor vehicles

Subsidizing the safety equipment, such as the installation of vision-based driver assistance system, to resolve the problem of blind spots on large motor vehicles

The 1st period: Earliest 2,000 large motor vehicles will be subsidized with full cost.
The 2nd period: 3,000 large motor vehicles will be subsidized with 80% of the cost.
Staring from 2018, the mandatory installation will be effective.

Vision-based Driver Assistance systems

Advanced Machine and Material Control System - Enhance Efficient Vehicle Management

In 1991, the machine and material control system took Dbase as its model and operated a singe-machine version for establishing all data regarding the vehicles and machines in each unit. Afterwards, the Information Office of the Directorate General of Highways updated the system to the Fox Pro version, so that all the units could send emails attached with the workload information (mileage, working hours, gasoline amount, maintenance) of the vehicle and machine to the Directorate General of Highways for collection. Finally, the relevance data can be applied directly in the system for creating statistics regarding the usage of the vehicles and machines of each unit.

Internet system upgrading · Faster and energy-saving

In 2001, the Information Office of the Directorate General of Highways upgraded the system to the internet version, so that each unit can type in the relevant data directly without sending emails. The system has become more convenient and easy to use. In 2011, the new machine and material system designed by an outsourced company can integrate the car dispatching system, basic information of vehicle and machine, workload of the vehicles and machines, and maintenance record. Moreover, without sending out a lot of data (such as car utilization performance, half-year report, annual report), the system can directly generate all the details of the vehicles. There's a large decrease of paper consumption, and the system can provide multiple control mechanisms, for example: online audits can obtain the maintenance information of the vehicles and machine, so that the judgment of whether the maintenance is reasonable can be done or problems can be found without reporting on-site.

Gradually decreasing the expense of gasoline - Easier process saves more money

By well-utilizing this management system, the gasoline consumption has been decreasing annually. In 2008, the gasoline consumption rate of public (engineering) cars was 0.130 liter/km. In 2011, the rate decreased to 0.124. In 2017, the rate was 0.123 liter/km. Comparing the dates from years after 2011 with 2008, a total of about 60,000 liters of gasoline has been saved every year. In 2008, the gasoline consumption rate of the machine and the driving test

training cars was 4.924 liters/hour. In 2011, the rate was 4.479 liters/hour. In 2017, the rate was 3.495 liter/hour. Comparing the dates from years after 2011 with 2008, a total of about 100,000 liters of gasoline have been saved. That means a large amount of government funds have been saved.

Promote efficient control and management - Clear and convenient

Besides, the efficiency maintenance control of cars and machines has also been promoted. In the past, the audit personnel have visited each unit to inspect the car-related information, then proposed possible problems. In other words, without sending personnel to the site, there's no way to obtain the information regarding material placement or maintenance. Now, with the online audit on the material and machine control system, the information of actual material replacement and maintenance situation can be obtained in no time, such as whether the execution of the 2nd or the 3rd degree maintenance followed the regulations, as well as requesting the unit to explain the real situation of the material replacement. The system has greatly promoted management efficiency. On the other hand, through the daily driving report, the utilizing situation of each car can be realized in detail. As a result, it's easy to judge whether the management of the car use is proper or not.

Because the cars and machines in the Directorate General of Highways are getting old, and the replacement budget is also downsized, with the material and machine management system in service, the cars and machine can operate properly and the replacement of materials and maintenance can be reasonable to make our operation able to run smoothly.

Chart 1 Gasoline consumption rate of the Public (engineering) vehicles

Year	Amount of gasoline (liters)	Mileage (km)	Average gasoline consumption rate (liters/km)	The amount of gasoline saved compared to the amount in 2008 (liters)
97	1384799	10641611	0.130	
98	1364728	10644676	0.128	21,289
99	1354861	10734189	0.126	42,937
100	1277318	10331616	0.124	61,990
101	1308733	10397917	0.126	41,592
102	1224399	10161538	0.120	101,615
103	1252223	10354940	0.121	93,194
104	1210698	9996046	0.121	89,964
105	1194942	9696321	0.123	67,874
106	1075043	8734910	0.123	61,144

Chart 2 Gasoline consumption rate of the machine and the driving test training cars

Year	Amount of gasoline (liters)	Working time length (hours)	Average gasoline consumption rate (liter/km)	The amount of gasoline saved compared to the amount in 2008 (liters)
97	1294278	262815	4.924	
98	1219003	264452	4.610	83,038
99	1091961	233900	4.668	59,878
100	902009	201403	4.479	89,624
101	839488	206676	4.062	178,155
102	722049	176850	4.083	148,731
103	664666	173344	3.834	188,945
104	555455	145854	0.121	700,537
105	515726	169467	0.123	813,611
106	430880	123269	0.123	591,814

Promoting Motor Vehicle Service - Make a Record-High Public Satisfaction

Motor vehicle self-service counter

In order to provide the public with a more comprehensive service, as well as promoting the public satisfaction rating, the Motor Vehicle Office has constantly provided optimized convenience to the public in all aspects. The Directorate General of Highways entrusted the marketing company to conduct a telephone survey of "public satisfaction to the service quality of the motor vehicle offices (stations) of the Directorate General of Highways" during August 7th to August 31st, 2017. There were 2,478 people taking the interview.

95.5%

Last year, there were 2,478 people who took the interview of surveying "public satisfaction to the service quality of the motor vehicle offices (stations) of the Directorate General of Highways" held by the Directorate General of Highways and the results showed public satisfaction with the services.

Satisfactory assessment - Record-high performance

The survey included six questions regarding the office environment and facilities, six questions regarding service staff's attitude and professionalism, 5 questions regarding convenient measures to the public and the implemented policies, as well as the overall satisfaction. Among all, "waiting time before reception", "counter personnel service attitude", and "car inspection crew's service attitude" obtained a record-high ranking through the years. 95.5% of the people showed satisfaction with the overall service quality provided in the 7 motor vehicle offices and 30 motor vehicle stations.

Among the 17 service-related items, 10 items had satisfaction over 90% and the average evaluation score was 86.2 points, which created a record-high result through the years. Among which, more than 95% of the people were satisfied with “volunteers’ or touring staffs’ service attitude” (96.5 %), “convenience of the service facilities” (95.6%), and “depth of the tire tread included into the list of car inspection ” (95.3%).

Professional service - Bringing convenience to the public

Furthermore, “counter personnel service attitude”, “counter personnel service professionalism”and “volunteers’ and touring staffs’ service attitude” all received high scores for importance and satisfaction, so that the three factors will be constantly listed as the advantages of the overall service. In the measures of bring convenience to the people and the implementation of policy, the feedback from the public are positive. Among which, the two policies related to road safety, “depth of the tire tread included into the list of car inspections”, and “road test included in the driving test” also received high understanding and satisfactory feedback. With the growth of young road users, “motor vehicle driver information service website” and “motor vehicle service APP” related to 3C products will become more important.

Through the survey, the service quality over the past year provided by the motor vehicle offices and stations can be reviewed to check the progress. Also, the survey is the most direct method to understand the public’s needs and opinions, so that responsive policies and measures bringing convenience to the public can be progressively discussed and planned. It’s hoped that the motor vehicle service quality can become more advance to satisfy the real needs of the people.

Motor vehicle service APP

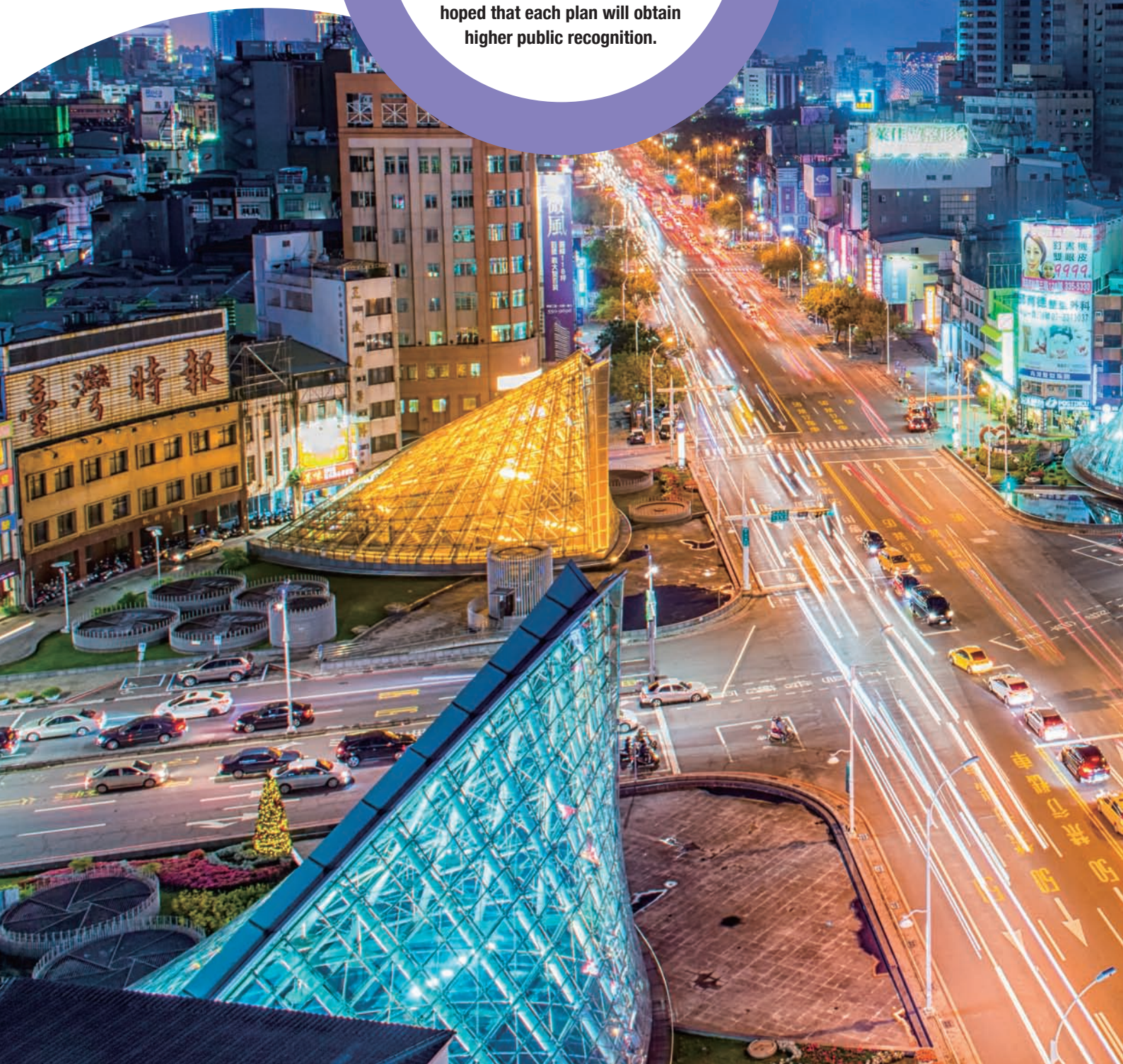
Progressive services provided by motor vehicle units.

Integrity

Transmit smartly, Road Information on Cloud system

Chapter 5

Road users are the basis of all plans, including the 24-7 road user service hotline, the third-generation motor vehicle and driver system, or the SafeTaiwan APP are constantly upgraded to reach the goal of sustainable development as well as the fulfillment of public service. It's hoped that each plan will obtain higher public recognition.




about 667,000 calls
Ever since June 8th, 2015, the Directorate General of Highways established the “24-7 road user service hotline”, 0800-231-035. Therehas about 667,000 calls answered until the end of 2017.

The Performance of the “24-7 Road User Service Hot Line” has Upgraded !

Since June 8th, 2015, the Directorate General of Highways established the “24-7 road user service hot line”, 0800-231035. For more than 2 years, the service has answered about 667,000 calls. There’re one thousand calls per day in average. The service has given answers to road users’ questions, also the Directorate General of Highways has played a good role as a bridge for communicating with the public.

All year round, One-call-for-all service

The purpose of the road user service hotline is to satisfy the public’s need for consulting, reporting or requesting the Directorate General of Highways about vehicle-related issues. With only one single service hotline offering an entire year of free service, a real-time and convenient communication approach is provided to the public. Besides, the “road user service hotline call center” is equipped with a professional operator system. A group of well-trained service staff provide immediate answering service. Based on the goal of “within one single call, the answers will be given to the questions proposed by the public”, the service performance of the Directorate General of Highways has been leveled up. Also, the workload of the staff in operation units will be reduced by fewer amount of jobs answering calls from the public’s consultation.

working situation of operating personnel

The working situation of the service staff at the call center

The real scene of the road user service hotline call center

Solid training - winning the public's recognition

Looking back on the year 2017, the road user service hotline has been keeping its excellent service performance. Over 90% of calls are responded with satisfying answers provided by the service staff. In the results of the callback satisfaction survey, more than 87% of the people gave positive opinion to the service. They are the evidence showing the success of this system. It also shows that the education training provided to the FAQ knowledge data base and the service staff is solid and precise.

Furthermore, the rate of answering calls within 20 seconds remains over 90%, and the average waiting time remains within 1 minute and 30 seconds. These facts show that the public don't need to spend much time waiting for the service. The convenient and speedy response is the key to a successful and reliable service hotline, and it will be the never-changing rule of constantly developing the standard operation of the "24-7 road user service hotline".

Active promotion - Additional communication approach

Certainly, to continuously promote and expand the performance of the road user service hotline, in 2017, the Directorate General of Highways has been actively introducing the information of the road user service hotline on the relevant website or APP service page. It's a convenience provided to the public who are browsing the website or using the mobile services and have the need of consultation with an easy communication approach. Meanwhile, the automatic answering system of each motor vehicle station of the Directorate General of Highways has provided the information of the road user service hotline. In addition to guiding the public to use the service, it's an additional vehicle-related consultation service provided after the operating hours of the motor vehicle office.

In the future, the Directorate General of Highways will put out continuous efforts to promote the service quality of the "24-7 road user service hotline". Also, it's the mission to make all customer services comprehensive in hopes of winning more public satisfactory recognition.

Third-Generation Motor Vehicle and Driver Information System - Recognized with the “2017 eAsia Awards”

Director of Information office Chen Shou-qiang received the award on behalf of the Directorate General of Highways

Motor vehicle services is the foundation of managing the national highway transport. How to utilize the new technology and tools to intensify the motor vehicle performance and service quality has been an important issue and challenge of developing the Motor Vehicle and Driver Information System.

Focusing on innovation - Smart service

In 1981, the Ministry of Transportation and Communications established the First-Generation Motor Vehicle and Driver Information System (hereafter called M1) to intensify the management and supervision of motor vehicle services, as well as promote administration efficiency and strengthen convenient service to the public. M1 computerized the motor vehicle services. Later on, in response to the continuous expansion of the workload and the range, the Second-Generation Motor Vehicle and Driver Information System (hereafter called M2) based on M1 was established in 1994. Afterwards, in 2012, with the people-based service direction, the Third-Generation Motor Vehicle and Driver Information System (hereafter called M3) was

established for providing integration, inclusion, intelligence and innovative services.

M3 has officially entered service in 2015 after numerous system tests and national drills. It can provide internal management for about 21 million car registration entries, about 28 million driver information forms, and also provide 53 cross-agency information services to external administration units, convenience stores, third-party inspection plants, Chunghwa Post Co., Ltd., telephone voice services, and motor vehicle service website. Meanwhile, many operations and systems are promoted, such as the capacity and flexibility of the Motor Vehicle and Driver Information System and simplified public application procedures. Also, one-stop service and several innovative services are able to be carried out.

A good model for the nation - International recognition

In 2017, M3 participated in the The "2017 eASIA awards" hosted every two years since 2003 by Anchorage Faith & Action, Congregations Together (AFACT). The purpose of the competition is to encourage the e-commerce application, information and communication technology as well as the relevant international standards to improve operation efficiency and promote the equal right to the use of information as well as linking to the world for bringing electronicalized special projects with realistic benefits. The participation of the competition established a good model for the electronic construction of our nation and can drive the electronic trend applied to overall industry. There were teams from South Korea, Bangladesh, Israel and other countries participating in the competition. M3 was awarded the silver prize of "Open Digital Government" in this intensive international competition.

Frequently recognized by awards - Bringing glory to the country

Ever since M3 started operation, with the attitude of constant improvement and a continuously optimized capacity and service quality, it has been awarded by the IT-enabled Services Management Association (itSMA) with the "2016 ITeS Award (Superior Technology Service Management Project by a Public Department)". The important person in charge of this special project, Director of Information officer Chen Shou-qiang, has won recognition by the award of "2016 ITeS Award (Outstanding Technology Service Manager)". Now, with the recognition by the prize of the "2017 eASIA awards", the Directorate General of Highways will keep working hard for better achievements in the hopes of making the service provided by the system become more effective and the people will be provided with more high-quality and multiple services.

M3 was awarded the "2017 eASIA- electronics achievement prize"

SafeTaiwan APP Recognized with the “Outstanding Technology Prize of 2017 Disaster Prevention Technology Award”

The Taiwan Association of the Disaster Prevention Industry held the "Disaster Prevention Technology Application Quality Award Campaign" to recognize those who have achieved excellent and innovative accomplishments, contributions, or product developments in cross-field product applications concerning disaster prevention technology. In September of 2017, the two-day "International Carnival of Disaster Prevention & Reduction" and the awards ceremony for the winners of the quality award were held at Kaohsiung University. In addition to the domestic host of the disaster prevention units, there were many well-known commercial products participating in the campaign.

Selfless contribution - Disaster management

Ever since SafeTaiwan was established, we have been insisting on breaking the boundary to promote each associated unit that takes the principles of overall national benefits, social welfare, and corporate citizen responsibilities by offering services free-of-charge in terms of the geographical information related to security issues, constant optimization and improvement of performances and service quality, as well as dedication to integrating the risk management information from 32 collaborative organizations (units) from industry, the government, and academia. Its purpose is to avoid the waste of repeated investment in geographical information resources and effectively promote the distribution of disaster information, thus helping the general public achieve the objective of disaster knowledge, disaster prevention, and disaster relief through the APP.

The representative receiving the 2017 Disaster Prevention Technology Application Quality Award"

The introduction of the winning products at the awards ceremony of the 2017 Disaster Prevention Technology Application Quality Award

Intense competition - Standing out from the competitors

In September of 2017, the SafeTaiwan App joined the "Disaster Prevention Technology Application Quality Award Campaign" attended by many excellent inventions. After an intense competition, the APP stood out from the competitors and won the Quality Award for Disaster Prevention Category while the "Public Warning System" created by the National Science and Technology Center for Disaster Reduction and the "Taiwan Earth Networks Total Lightning Network (ENTLN)" also won the same recognition. These are the facts showing the cross-field cooperative and innovative application of risk management and disaster prevention technology completed by the collaboration of the Directorate General of Highways and associated organizations (units) recognized in the aspects of industry, government and academia.

Endless applause - Pursuing constant improvement

Ever since its launch, SafeTaiwan has won national recognition, such as the 2013 IT Month Top 100 Innovative product and the 10th Golden Map Award. Also, in 2016, it was again listed as an IT Month Top 100 Innovative product. Now, it won the "2017 Disaster Prevention Technology Application Quality Award". These awards are definitely the most realistic and acute recognitions, and the biggest applause to the execution team of the Directorate General of Highways and associated organizations (units) will continuously drive us to pursue the constant improvement for developing better quality service!

Communicating and exchanging experiences with the units jointly participating in the International Carnival of Disaster Prevention & Reduction

The ST-APP created by the Directorate General of Highways won the 2017 Disaster Prevention Technology Application Quality Award

Passed the “2017 Integrity Assessment” Successfully !

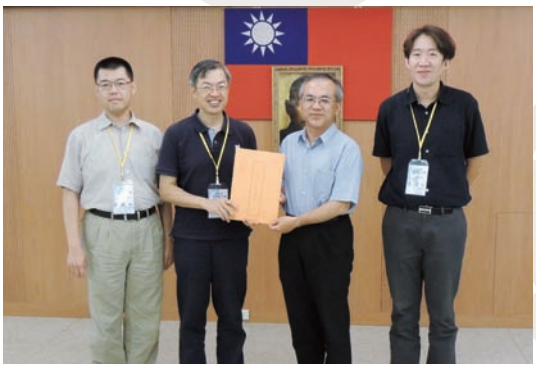
A group photo of 2017 integrity committee members with the chief officers

The Agency Against Corruption of the Ministry of Justice entrusted Transparency International-Taiwan to manage "the promotion of integrity evaluation”- establish an “assessment standard”, and the execution of a “trial integrity evaluation of the administration”. In 2017, 6 departments from the central government and 14 departments from local government received the trial evaluation for carrying out the overall examination on the reliability, efficiency, compatibility and comprehensiveness as each index of the assessments. The Directorate General of Highways has been involved as the administration receiving the trial integrity evaluation and the evaluation was processed during April to August 2017.

Internal and external evaluation - Inspecting the operation performance

The trial evaluation was divided into two stages, the “self-evaluation” and “expert on-site evaluation”. The Director Chen Yan-Po was the convener of the 1st stage and a “self-evaluation team” was established. It started from collecting and analyzing the data from 2014 to 2016, inspecting the realistic integrity performance and difficult execution and the resolution, and then included a written self-evaluation report for inspection. The second stage was performed by a committee consisting of experts and scholars via an on-site visit to the Directorate General of Highways for the external evaluation. The three members of the evaluation committee are the Associate Professor of the Department of Public Policy and Management at Shih-Hsin University Chen Jun-Ming, the Associate Professor of the Department of Public Administration at Tamkang University Ceng Guan-Qiu, and the Associate Professor of the Department of Public Policy and Management of Shih-Hsin University Fan Kai-Hong.

The scene of committee members inspecting documents



A group photo of Director with the evaluation committee members

Administration with integrity - Defending integrity

The on-site evaluation meeting was held on August 17th, 2017 at the Directorate General of Highways and hosted by Director Chen Yan-Po. Secretary General Lin Fu-shan and the chief executive officers of the relevant administrative departments attended the meeting. It showed our management had integrity and the determination of defending integrity. During the evaluation, the members of the committee inspected documents, interviewed and interacted with the staff of the relevant departments, and they confirmed that the Directorate General of Highways has engaged in efforts to emphasize operation with integrity, measures against corruption, and an internal monitoring mechanism. They also proposed valuable suggestions of reinforcement of integrity risk control and clear and open administrative measures. After the committee finished the on-site evaluation, Director Chen, with other three members of the evaluation committee, jointly signed the "accomplishment of evaluation" signifying the on-site evaluation was completed successfully.

The Agency Against Corruption of the Ministry of Justice held the demonstration of the 2017 integrity trial evaluation on September 27th, 2017, and the result was sent to the Directorate General of Highways to notify the Directorate General of Highways that it had been "approved" (the total score over 90 points) in this evaluation. The improvement suggestions provided by the evaluation committee will be taken as a reference for future administrations. The Directorate General of Highways will take committee member suggestions as the principle of constant reinforcement of clear and open administration, as well as management with integrity in hopes of achieving the goal of the administration with integrity.

The scene of 2017 Integrity Trial Evaluation on-site meeting.

Excellent Crews Won the Honorable Award of "2017 Honesty and Integrity"

A group photo of He Chen Dan, the Minister of the Ministry of Transportation and Communications, with our peers who are the winners of the 2017 Integrity and Honesty Model

Administration with integrity can build a great image of the administration. Also, it's a foundation for people to trust the government. The Directorate General of Highways in charge of the overall highway construction and motor vehicle supervision operation in Taiwan has been working closely with pubic road safety. The operation with integrity, open and clear administration has a direct influence on the people's perspective toward the government.

Integrity and Honesty - Good model and example

Consequently, through internal selection of the candidate attending "The 10th Award of Integrity and Honesty Model", we recommended our peers with excellent performances in their relevant units regarding the aspects of "fulfilling government integrity rules by refusing any kind of bribes", "Saving a lot of government funds during administrative operation", or "proposing innovative measures to eliminate corruption and encourage devotion".

After the rigorous evaluation procedures performed by the scholars and experts specially employed by the Ministry of Transportation and Communication, the two peers, Maintenance Mechanic Wang Tian-Cai, Technique Development Session of the Training Center, the Directorate General of Highways and Chief Chen Tang-sheng of the Information Office of Kaohsiung City Motor Vehicle Station surpassed the other 31 candidates and were awarded with the prize. They received the prize awarded by the Minister of the Ministry of Transportation and Communication.

2017 Integrity and Honesty Model- Wang Tian-cai, Maintenance Mechanic of Technique Development Section of Training Institute

2017 Integrity and Honesty Model- Chen Tang-sheng, Chief of Information management Office of Kaohsiung City Motor Vehicle Office

Refuse gifts - Making reports in accordance with the laws

Our co-fellow Wang has great performance in the aspects of "Against corruption to save government funds" and "fulfilling or promoting government official's integrity rules": To resolve the current difficult situation of insufficient quantity of cars and the old car displacement at the Training Center, he progressively negotiated with other units for the displacement and schedule of the cars. The quantity of cars used for training at the unit is sufficient, and an amount of TWD 127,000 on car maintenance was saved. Moreover, during the execution of administration operation, he refused gifts and cash from the vendor without hesitation. Afterwards, he reported the situation to the department of Civil Service Ethics.

Self-development - Reducing waste of money

Chief Chen has great achievement in the aspect of "against corruption and saving government funds": During managing the overall environment improvement of the computer facility lab at the South Information Center of the Directorate General of Highways, he effectively saved 33% of the funds in the amount reaching TWD 4.82 million, also the current efficiency of energy consumption was promoted. And, he self-developed the "eTouch control APP", which reduce the fee of management, maintenance, and the warning text messages. The APP was awarded First Class at the 2016 MOTC Innovative Proposals Competition. Furthermore, he invented the "Intelligence Smart Motor Vehicle Office - People-Based APP System" to reduce the processing time of each case. By the APP notification, 4.82 million NTD of government funds were saved.

TWD 4.82 million

Chief Chen Tang-sheng, Information Management Office of Kaohsiung City Motor Vehicle Station has great performance against corruption and saving government funds in an effective approach.

The two peers at the affiliated units of the Directorate General of Highways are responsible and upholding integrity, so they deserve to be awarded the 2017 Integrity and Honesty Model by the Ministry of Transportation and Communication. In the future, all the staffs in DGH will fulfill "integrity" in both working and life to create a working environment with "Integrity, public safety, information safety and traffic safety"

Abundance

Keep initial goal in mind
Reach perfection

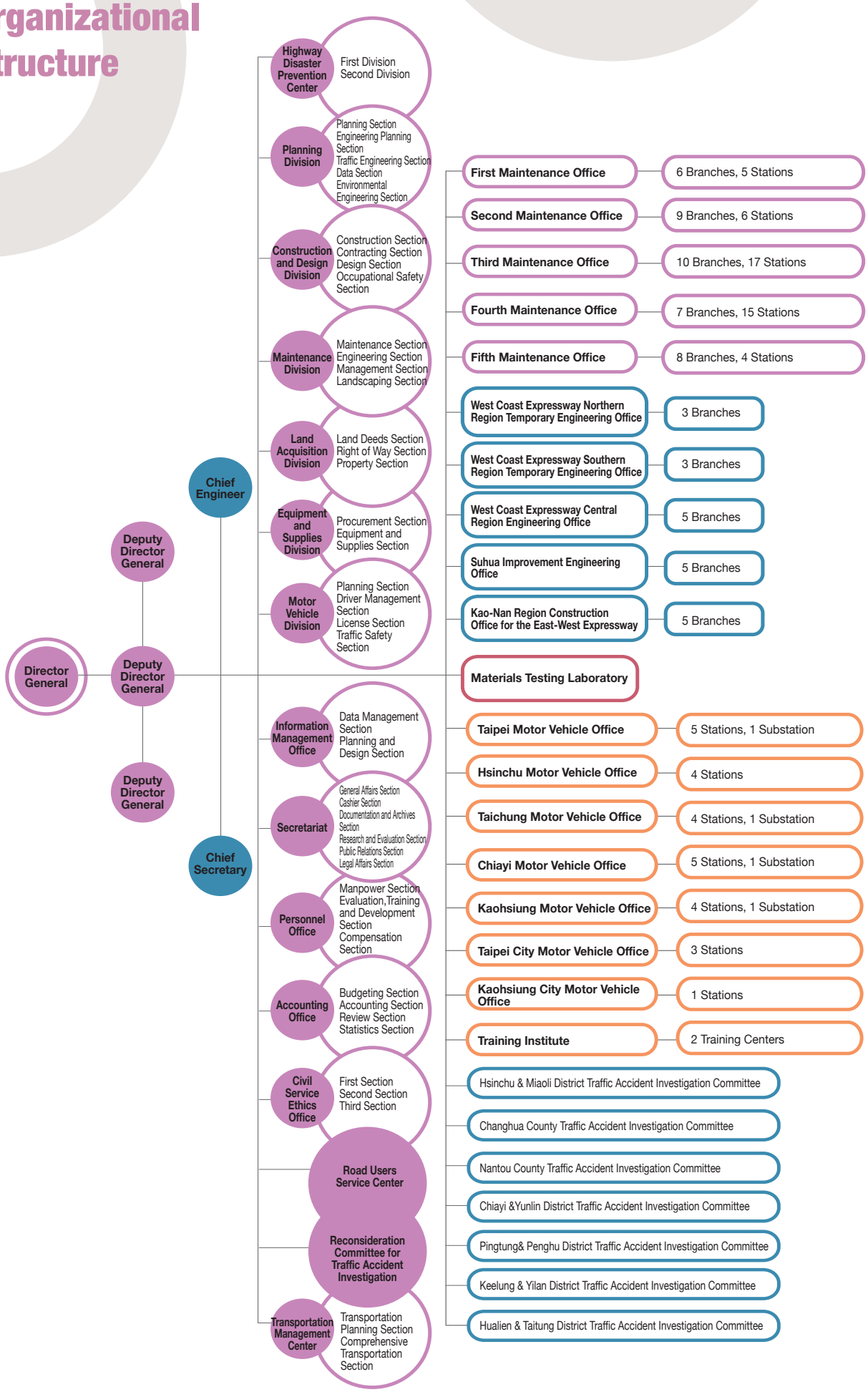
Chapter 6

The plans we made and based on road users' perspective serve as the guidelines to promote future policies, a "heartful" way to safety and happiness is expected to be created and make the way home safer, more convenient and smoother!

1st place

The General Highway Bureau was awarded the 1st place in MOTC's 2017 Annual Achievement Evaluation for First Level Subsidiary Agency.

Organizational Structure



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	7,694,158	2010-2020	Executive Yuan
Follow-Up to the West Coast Expressway Continuous Construction Project	8,618,478	2009-2019	Executive Yuan
Follow-Up to the South Link Highway of Provincial Highway No.9 Widening Project	4,065,000	2011-2020	Executive Yuan
The Huatung Highway of Provincial Highway No. 9 Safe Landscape Boulevard Project	9,000	2017-2024	Ministry
Danjiang Bridge and Connecting Roads Construction Project (fund excluded)	648,000	2014-2020	Ministry
Highway Public Transport Multiple Enhancement Project	2,874,782	2017-2020	Ministry
Region-Based Road System Construction Project (Highway System; 2015 - 2018)	3,610,212	2015-2018	Ministry
Highway Improvement Project	5,609,155	2013-2018	Ministry
National Bicycle Friendly Route Network Planning Project and The contruction for Bicycle Network by MOTC Project	251,381	2015-2018	Ministry
Construction of Provincial Highway Bridges Needed for Regional Drainage & Regulation and Environment Construction Plan for Major Rivers	569	2015-2020	Autonomous Management
Construction of Provincial Highway Bridges Needed for the River Environment Construction Plan for Major Rivers	276,079	2015-2020	Autonomous Management
Highway Maintenance Project	9,971,695	2017-2017	Autonomous Management

Research and Development

Number	Name of Research Development	Research Unit	Researchers
1	Research on the practice of insurance contribution of national compensation payment	Second Maintenance Office	Chen Jing-ming, Xie Zhe-xiong, Li xi-ying, Zhang Yi-quan
2	Research on the applicability of river gravel in the northern rivers in Taiwan	Materials Testing Laboratory	He Hung-wen, Chu Chien-tung, Hon Min-jay, Chiu Jui-chang, Zeng Zi-yan, Huang Rong-bo, Su Shin-yong
3	The research on the effectiveness and characteristics of using different asphalt concrete as the filling materials	Materials Testing Laboratory	He Hung-wen, Chu Chien-tung, Hon Min-jay, Kuo Hung-teng, Su Shin-yong, Lin Yi-chen
4	Analysis of implementation of new motorcycle road test - Banqiao Motor vehicle Station as the example	Banqiao Station, Taipei Motor vehicle Office	Wang Mei-xiang, Lin Cai-zhong, Zheng Bao-feng, Zhang Yu-qian, Liao Su-zhen, Zhang Yu-cheng
5	Deep rooted public transportation safety education	Hsinchu Motor vehicle Office	Lin Cui-rong, Li Rui-ming, Liang Chun-quan, Huang Cheng-min, Su Shu-xian, Fu Pei-xuan, Lin Yi-chen, Jiang Wen-ying
6	Assessment of Outsourcing the road traffic training	Miaoli Station, Hsinchu Motor vehicle Office	Chen Fu-fa, Zhu Shou-xin, Zheng Rui-long
7	Feasibility assessment of Digital eduction applications as the regular course	Training Institute	Ceng Xin-min, Xie Yi-xian, Ye Pei-jun, Wu Liao-cheng and Han Meng-lin
8	Feasibility Assessment Cars for road driving tests equipped with blind spot assistance alert system	Central Region Training Center, Training Institute	Ye Qi-zhuan, Zhuang Jie-tang, Chen Zong-xin, Dai Liang-han, Jian Pei-qing

Competition Results

Number	Evaluation or the name of the Competition	Awarded Unit	Result
1	2017 Performance Evaluation of the Chief Administration Departments of Ministry of Transportation and Communications	Ministry of Transportation and Communications	First Place
2	2016 Annual Evaluation of Motor Vehicle Agencies Collecting Vehicle Fuel Fees	Directorate General of Highways	Superior
3	East-West Expressway Construction Projects and Network Improvement Projects	Directorate General of Highways	Excellent
4	2017 MOTC Golden Way Award—outstanding landscape category	Jingmei Branch, First Maintenance Office	First Place
5	2017 MOTC Golden Way Award—road user information category	Jhonghe Branch, First Maintenance Office	First Place
6	2016 Evaluation of Traffic mobilization plan and Natural Disaster Prevention and Rescue	First Maintenance Office	Excellent
7	2017 Ministry of Labor promoted labor safety and health outstanding public construction— Provincial Highway No.13 A 13K + 707 Beishi Bridge Construction	Miaoli Branch, Second Maintenance Office	Excellent
8	2017 Ministry of Labor promoted labor safety and health outstanding public construction— Provincial Highway No.21 mark 78K + 647 Longshen Bridge RE-Construction	Sinyi Branch, Second Maintenance Office	Excellent
9	2016 MOTC Innovative Proposals Competition— Traffic Cloud Driver's Data	Second Maintenance Office	Creative Award
10	2017 MOTC Golden Way Award—outstanding landscape category	Fonggang Branch, Third Maintenance Office	First Place
11	2016 Evaluation of Bridge Maintenance Management—Section	Fonggang Branch, Third Maintenance Office	First Place
12	2016 Participation with Disaster Prevention and Rescue	Third Maintenance Office	Superior
13	2017 MOTC Golden Way Award— road maintenance category	Fourth Maintenance Office	First Place
14	2016 Participation with Disaster Prevention and Rescue	Fourth Maintenance office	Superior
15	2017 MOTC Golden Way Award— road maintenance category	Alishan Branch, Fifth Maintenance Office	First Place
16	2017 Ministry of Labor promoted labor safety and health outstanding public construction— Provincial Highway No.18 Wuwanzi Construction	Alishan Branch, Fifth Maintenance Office	Honorable Mentions
17	The 15th Golden Wingspan Award—2017 Progressive policy employment of the impaired	Fifth Maintenance Office	First Grade Award
18	The 15th Golden Wingspan Award—2017 Progressive policy employment of the impaired	West Coast Expressway Northern Region Temporary Engineering Office	First Grade Award
19	2017 Ministry of Labor promoted labor safety and health outstanding public construction— West Coast Expressway WH-10A mark (54k+320~60k+312) construction project	West Coast Expressway Northern Region Temporary Engineering Office	Honorable Mentions
20	The 16th Public Construction Commission Goledn Quality Award— West Coast Expressway195k+995 ~199k+348.5 (WH50-2 mark) Wanggong to Yongxing Section Construction	West Coast Expressway Central Region Engineering Office	Excellent

Number	Evaluation or the name of the Competition	Awarded Unit	Result
21	2017 Ministry of Labor promoted labor safety and health outstanding public construction— Provincial Highway No.9 south-link highway C2 Tunnel Construction	West Coast Expressway Southern Region Temporary Engineering Office	Excellent
22	2017 Ministry of Labor promoted labor safety and health outstanding public construction— Entrusted by the Taiwan Railway Kaohsiung Provincial Highway No.1 elevated bridge construction	Kao-Nan Region Construction Office for the East-West Expressway	Honorable Mentions
23	The 16th Public Construction Commission Goledn Quality Award— Provincial Highway No.9 Suhua Highway Su'ao to Yongyue section	Suhua Improvement Engineering Office	Civil engineer level 1 Honorable Mentions
24	2016 Award of "Improvement Program for Traffic Order and Safety" Annual Inspection by Executive Yuan— group overall score team 1	New Taipei City Government (Taipei Motor vehicle Office)	First Place
25	2016 Award of "Improvement Program for Traffic Order and Safety" Annual Inspection by Executive Yuan— safety advocacy team 1	New Taipei City Government (Taipei Motor vehicle Office)	First Place
26	The 9th Road Traffic Innovative Motor Vehicle Supervision	Taipei Motor vehicle Office	First Place
27	2016 Inspection of "Improvement Program for Traffic Order and Safety"— motor vehicle office team 2	Hsinchu County Government (Hsinchu Motor vehicle Office)	First Place
28	2016 Award of "Improvement Program for Traffic Order and Safety"— group overall score team 2	Hsinchu County Government (Hsinchu Motor vehicle Office)	First Place
29	2016 "Motor Vehicle Survey" Outstanding Business Vehicles Survey Unit	Hsinchu Motor vehicle Office	First Place
30	2016 Award of "Improvement Program for Traffic Order and Safety"— group overall score team 3	Nantou City Government (Taichung Motor vehicle Office)	First Place
31	2016 Award of "Improvement Program for Traffic Order and Safety"— motor vehicle office team 3	Nantou City Government (Taichung Motor vehicle Office)	First Place
32	2016 Inspection of "Improvement Program for Traffic Order and Safety"— Dump Truck Management	Tainan City Government (Chiayi Motor vehicle Office)	First Place
33	2016 Award of "Improvement Program for Traffic Order and Safety"— motor vehicle office team 1	Tainan City Government (Chiayi Motor vehicle Office)	First Place
34	2016 Direct Municipality City, County (City) Citizen Coordination Meeting, and inspection	Chiayi City Government (Chiayi Motor vehicle Office)	First Place Superior
35	The 15th Golden Wingspan Award— 2017 Progressive policy employment of the impaired	Kaohsiung Motor vehicle Office	First Grade Award
36	2016 MOTC Innovative Proposals Competition— digital application of the motor vehicle registration	Taipei City Motor vehicle Office	Creative Award
37	2016 MOTC Innovative Proposals Competition— Motor vehicle self-service counter	Kaohsiung City Motor vehicle Office	Innovation Award First Class
38	2016 MOTC Innovative Proposals Competition— e-touch Control APP	Kaohsiung City Motor vehicle Office	Innovation Award First Class
39	Award of Ministry of Transportation and Communications Service Quality— Chief Service Administration	Kaohsiung City Motor vehicle Office	Excellent
40	Asphalt tiles installation method (Obtained a Patent)	Materials Testing Laboratory	Obtain a patent

Major Events

Jan.		
January 3rd	During the New Year's Holiday (December 31st 2016 to January 2nd 2017) traffic congestion-reduction management was completed on January 3rd 2017. The total capacity of the West National Highway transport was 12,226, the passenger capacity was 260,654 people; The National Highway No.5 bus had 2,029 schedules, and the passenger capacity was 377,798 people.	Transportation Management Center
January 9th	Provincial Highway No.66 elevated crossing of Tao Highway No.81, Tao No.79 and Provincial Highway No.31 is completed and open to public on January 9th 2017.	Construction and Design Division
January 16th	The job Chief Engineer of the Directorate General of Highways (Former Chief Engineer Zhang Yun-hong is retired) will be taken over by the former Deputy Chief Engineer Lai Chang-xiong, and the promotion was approved by MOTC on January 4th.	Personnel Office
January 16th	The job as the Chief of Taipei Motor vehicle Office (Former Chief Chen Yu-hao is retired) will be taken over by the Chief of the Secretariat Li Ying-dan. The promotion was approved by MOTC on January 4th.	Personnel Office
January 24th	The Follow-Up to the South Link Highway of Provincial Highway No.9 Widening Project A3 mark Douliang Elevated bridge Section was open to public on January 24th, 2017.	Construction and Design Division
January 24th	In response to the traffic congestion-reduction, the Shalu Overpass that was open to public on January 24th at 9 am.	Maintenance Division
Feb.		
February 11th	The 2017 Wuling Farm Cherry Blossom season traffic congestion-reduction plan started on February 11th and lasted until February 28th. Public transportation and traffic congestion-reduction management were implemented for ensuring smooth traffic.	Planning Division
February 25th -28th	For the 2017 four-day 228 Consecutive Holidays between February 25th to 28th, the traffic congestion-reduction measure was reinforced along with traffic inspection.	Planning Division Motor vehicle Division
February 27th	Provincial Highway No.9 240k+700~242k+695 (Fengxin section) widening project was completed on February 27th.	Construction and Design Division
Mar.		
March 1st	Since March 1st, all Motor Vehicle Offices (Stations) extended their hours of "drunk driving class" and "drunk driving recidivism" from 4–6 hours to 6–12 hours respectively.	Motor vehicle Division
March 10th	Jiukuaicuo Interchange, the Follow-Up to the West Coast Expressway Continuous Construction Project WH77-C mark, was completed.	Construction and Design Division
March 10th	In 2017, during the Alishan Cherry Blossom season period between March 10th to April 10th, the on-site traffic inspection was done by the Directorate General of Highways.	Planning Division
March 25th	"Provincial Highway No.9 south-link highway, Ansu to Caobu Section, C2 Tunnel construction" southbound Nankou to Shujin Section was completed.	Construction and Design Division
Apr.		
April 1st	Since April 1st, the working age limitation to the drivers of business vehicles will be extended from 68 to 70 years old. After passing the cognition test, the driver's license will be extended 1 extra year.	Motor vehicle Division
April 1st -4th	During April 1st to 4th, the "2017 consecutive holidays traffic congestion-reduction plan" was effective and completed with the transport capacity of 11,724 schedules and the passenger capacity was 250,444 people. National Highway No.5 had a daily average 1,956 schedules with the passenger capacity of 38,715 people.	Planning Division Transportation Management Center
April 29th	Provincial Highway No.20, Taoyuan Qinhe to Fuhsin Section Bridge Improvement construction, the Directorate General of Highways invested TWD 960 million and it was completed on April 29th, 2017 to be used as disaster prevention.	Maintenance Division

May		
May 1st	The Directorate General of Highways started the road driving test for small vehicles on May 1st. The citizens will get more confidence to drive on the roads after getting their driver's license.	Motor vehicle Division
May 5th	The Directorate General of Highways member of the special committee Cao Zhuan-men and Deputy Chief Engineer Chi Li-min and the Branch Chief of the Fifth Maintenance Office Huang Qiu-yang got awarded the 2017 Government Official Model by the Ministry of Transportation and Communications.	Personnel Office
May 10th	Wulai Access Provincial Highway No.9-A Xinwu Highway became an isolated area after Typhoon Soudelor, the Directorate General of Highways started reconstruction at the earliest time. The most difficult part of Provincial Highway No.9-A is at 10.2k, the Rainbow Bridge. It' was completed on May 10th and open to public.	Maintenance Division
May 15th	The Director Inspected the site of the West Coast Express WH50-2 mark and WH51 mark on May 15th.	Construction and Design Division
May 15th	On May 15th, the Taiwan Highway Museum "Walking on Provincial Highway No.3" special exhibition for displaying the landscape, history and local economics was held. The exhibition is open until July 30th.	Road Users Service Center
May 26th -31st	On May 26th, the "2017 Dragon Boat Festival Consecutive Holiday traffic congestion-reduction plan was successfully effective. The daily transporting capacity was 11,876 schedules with the passenger capacity 243,769 people. On the National Highway No.5, the daily transporting capacity was 1,968 scheduled, and the passenger capacity was 38,664 people.	Planning Division Transportation Management Center
Jun.		
June 3rd	The Director inspected the Provincial Highway No.9 Suhua Highway A2 Dong'ao Tunnel New Construction.	Construction and Design Division
June 16th	"Expressway NO.82 30k+700~31k+400 road enhancement construction" was open to public with an extra height of 3 meters.	Maintenance Division
June 22nd -23rd	During June 22nd to 23rd, Executive Yuan Public Construction Chief Committee Wu Hong-mou inspected the Follow-Up to the South Link Highway of Provincial Highway No.9 Widening Project.	Construction and Design Division
June 30th	The total of 15 peers including Engineer of Highway Disaster Prevention Center Disaster Prevention Xu Shi-xuan, Chief of the Motor vehicle Division Yang Cong-xian, Specialist of the Information office Huang Hui-zhen, Division Chief of the Second Maintenance Office Wu Zhi-zhong, Engineer of the Third Maintenance Office Sun Bai-qing, Deputy Chief Engineer of the Fourth Maintenance Chen He-ren, Chief of the Taipei Motor vehicle Office and Luzhou Motor vehicle station Jiang Mei-ying, Deputy Chief of the Hsinchu Motor Vehicle Office Li Rui-ming, Staff of the Taichung Motor Vehicle Office Chen Hui-zhen, Kaohsiung District and Taitung Motor vehicle Station Zhong Bing-jun, Secretary of the Taipei City Motor vehicle Office Li Ming-zheng, Chief of the Information office of Kaohsiung Motor Vehicle Office He Ming-yong, Engineer Zhong Zong-ying, Specialist of the West Coast Express Central Construction office Yan Hua-long, East-West Expressway Kaonan Office Yang Kai-lin were awarded by the Directorate General of Highways with the 2017 Government Official Model and received their recognition on June 26th, 2017 in the regular operation meeting.	Personnel Office
Jul.		
July 1st	The Senior Drivers management system started on July 1st, 2017. Drivers at the age of 75 years old should replace their three-year validity driver's licenses within three months.	Motor vehicle Division
July 17th	The job as the Deputy Director of the Directorate General of Highways was taken over by the Chief Engineer of the South National Highway Bureau Zu Zheng-zhang.	Personnel Office
July 17th	Provincial Highway No.9 Suhua Highway Su'ao to Yongyue section was open to public.	Construction and Design Division

July 18th	The plan of the "Web Version digital highway service platform installation (the 2nd stage)" was completed by the joint inspection of the vendor, the finance division, and Ethics division.	Planning Division
July 20th	The Environmental Protection Administration agreed to the application of "Provincial highway No.31 extended from Provincial Highway No.66 to Provincial Highway No.1" and the environment impact report.	Planning Division
July 25th	The Environmental Protection Administration agreed to the application of the "Danjiang Bridge and related access road planning impact report".	Planning Division
July 27th	The metal protection over the Boalai bridge on Provincial Highway No.20 was built after typhoon Molake, the Directorate General of Highways Third Maintenance Office has enhanced the protection for better structure.	Maintenance Division
July 28th	The Director inspected the Follow-Up to the West Coast Expressway Continuous Construction Project Guanying to Fengkung Section.	Construction and Design Division
Aug.		
August 2nd	The job as the secretariat of the Directorate General of Highways (Chen Wen-rui has been promoted to the job as the Minster of Road Management of the Ministry of Transportation and Communications) was taken over by the Deputy Engineer Lin Fu-shan and it's was approved by the MOTC on August 1st.	Personnel Office
August 10th	Provincial Highway No.9 Suhua Highway Nan'ao Wuta section 1st stage was completed.	Construction and Design Division
August 14th	The Directorate General of Highways Hosted the Happy Highway (Safety on the way) The story of driver's license" special exhibition.	Road Users Service Center
August 16th	The Minister of the Ministry of Transportation and Communications He Chen Dan and Director Chen Yan-Po the Directorate General of Highways, chief secretariat, chief of each motor vehicle office joined the press conference of "Choose, stand by you" public transportation website sharing activities."	Transportation Management Center
August 17th	The Environmental Protection Administration agreed to inspect "The Suhua Highway of Provincial Highway No.9 Mountainous Section Improvement Project (Su'ao~ Dong'ao, Nan'ao ~ Heping, He-zhong ~ Daqingshui) The 2nd revised content comparison of the environment impact report (final version)".	Planning Division
August 25th	The Directorate General of Highways "Region-Based Road System Construction Project (Highway system)" approved 6th project plan on August 25th Ministry of Transportation and Communications. The Planning Division was notified of the implementation of each unit.	Planning Division
August 29th	The Minister of the Ministry of Transportation and Communications He Chen Dan Inspected the Provincial Highway No.9 Safety Landscape Boulevard construction.	Maintenance Division
August 31st	The Deputy Minister of the Ministry of Transportation and Communications Qu Wen-zhong and the Director of the Directorate General of Highways Chen Yan-po gave the award at the awards ceremony of the 2017 Public Transportation competition 2nd stage at the Jisi conference center.	Transportation Management Center
Sep.		
September 1st	The vision-based driver assistance systems installation for improving the safety was activated on September 1st accordingly.	Motor vehicle Division
September 4th	"West Coast Expressway 195k+995-199k+348.5 (WH50-2 mark) Wangkung and Yuhsin Section" was completed.	Construction and Design Division
September 12th	The Directorate General of Highways established the Third-Generation Motor Vehicle and Driver Information System which was awarded "Open Digital Government prize" of the "2017 eAsia awards".	Information Management Office
September 12th	Provincial Highway No.9 Suhua Highway Nan'ao to Wuta Section (B1 mark) was completed.	Construction and Design Division

September 13th	The Jishan Bridge enhancement project on Provincial Highway No.9 was completed. The road traffic will be greatly improved.	Maintenance Division
September 14th	West Coast Expressway Badongliao to JiuKuaiCuo WH77-B mark and Qiguxi Bridge were completed.	Construction and Design Division
September 18th	West Coast Expressway WH09-A mark 48k+970~54k+320 were competed.	Construction and Design Division
September 19th	Deputy Chief of the Ministry of Transportation and Communications Wang Guo-cai inspected the Follow-Up to the South Link Highway of Provincial Highway No.9 Widening Project.	Construction and Design Division
September 20th	The Directorate General of Highways established the "SafeTaiwan APP", and it was awarded the "2017 disaster prevention application award" by the Taiwan Disaster Prevention Association.	Information Management Office
September 30th	Nan'ao railway crossing enhancement construction was initiated on October 15th 2015, and and had completed on September 30th.	Maintenance Division
Oct.		
October 5th	Personnel of the Vietnam National Transport Department visited the the Directorate General of Highways for the motor vehicle supervision system public transportation development and motorcycle traffic management measure.	Motor vehicle Division
October 15th	"Provincial Highway No.9 412k+350~415k+500 widening and improving work" on the section between Douliang and Jilun at Taitung County was completed and open to public at 5 pm.	Maintenance Division Construction and Design Division
October 18th	The job as the Chief of Hualien & Taitung District Traffic Accident Investigation Committee was taken over by the chief of Hualian Station of Taipei Motor vehicle Office Lin Fu-ying, and it was approved by MOTC on October 17th.	Personnel Office
October 18th	The job as the Chief of Keelung & Yilan District Traffic Accident Investigation Committee was taken over by the chief of Yilan Station of Taipei Motor vehicle Office Chen Hong-da, and it was approved by the MOTC on October 17th.	Personnel Office
October 19th	Forward-Looking Infrastructure- Road quality enhancement plan (Highway system) the 2nd meeting. (Chiay, Yunlin and New Taipei City).	Planning Division
October 23th	"The Directorate General of Highways collaboration with the Ministry of Transportation and Communications on the subsidy plan of vision-based driver assistance systems", was approved by the Ministry of Transportation and Communications and the application was started.	Motor vehicle Division
October 27th	Forward-Looking Infrastructure -Road quality enhancement plan (Highway system) the 3rd meeting (Kaohsiung, Pingtung, Taitung, Penghu, Nantou, Miaoli and Taoyuan City).	Planning Division
Nov.		
November 1st	Wang Qing-xiong, Chief of Jiasian Branch of the Third Maintenance Office, was awarded the 2017 Civil Service Outstanding Contribution Award and the awards ceremony was held on December 13th.	Personnel Office
November 1st	Provincial Highway No.8178k+500 Buluowan Tunnel construction was initiated on June 24th, 2015, and the construction cost was about TWD 219 million. The length of the tunnel is 462 meters and it was open to public on November 1st.	Maintenance Division
November 10th	Forward-Looking Infrastructure -urban and rural construction- insufficient parking problem enhancement plan was approved by Executive Yuan on November 10th.	Planning Division
November 11th	West Coast Expressway between Qigu Interchange and Shifen Interchange was open to public.	Construction and Design Division

November 13th	The Environmental Protection Administration hosted the meeting for "the environment impact report of the Follow-Up to the South Link Highway of Provincial Highway No.9 Widening Project (Caobu to Danlu section enhancement construction)" the 2nd special project meeting approved the report.	Planning Division
November 17th	Region-Based Road System Construction Project (2015-2018) of the 7th amendment project plan was approved by Ministry of Transportation and Communications.	Planning Division
November 19th -24th	The 32nd Sino-Japanese Modern Engineering and Technology Symposium.	Planning Division
November 27th	The budget for subsidizing the 1st stage of Forward-Looking Infrastructure- "Urban and Rural Construction" The Subsidy to the local government was TWD 135.2 million .	Planning Division
November 27th	Forward-Looking Infrastructure -Road quality enhancement plan (Highway system) 2nd meeting.	Planning Division
November 30th	The Directorate General of Highways completed the registration of the vision-based driver assistance systems in response to the Ministry of Transportation and Communications.	Motor vehicle Division
Dec.		
December 1st	The Mandatory traffic violation fine can be paid by installments at 7-11 and Family Mart convenience stores starting December 1st.	Motor vehicle Division
December 1st	In response to the the need of open information applications, the motor vehicle information is opened on December 1st, 2017.	Motor vehicle Division
December 1st	Miaoli Provincial Highway 32k~33k Dapingding section New construction was completed and open to public on December 1st. It was started on December 31st, 2015 the entire length of this route is 980 meters, and 468 l is the length of bridge section. The total road length is 512 meters and the construction cost 435 million. The local economy will be boosted afterwards.	Maintenance Division
December 5th	West Coast Expressway Guanying to Yungan Interchange was open to public.	Construction and Design Division
December 7th December 22th	Forward-looking Infrastructure-"Road quality enhancement plan" 5th inspection meeting. The Subsidy from the central government was TWD 2.33 billion, and the 103 proposals on December 22nd shared the subsidy from the central government with TWD 2.91 billion.	Planning Division
December 15th	Deliver the approved subsidy regulations of "Forward-Looking urban and rural construction-Improvement plan of Parking insufficient problem" to each city and county.	Planning Division
December 19th	The section between Wanggong Interchange and Fangyuan Interchange of the West Coast Expressway was open to traffic.	Construction and Design Division
December 20th	The 322nd meeting of Environmental Protection Administration Environment influence evaluation committee about "Provincial Highway No.9 widening and improving work, the 2nd analysis report of environment influencing changes (Caobu and Dan Section), and the result was approved.	Planning Division
December 21th	The Directorate General of Highways reports the "Provincial Highway No.9467k+450~468k+500 (Danlu Access) Enhance Construction Amendment to the Ministry of Transportation and Communications.	Planning Division
December 22th	The Directorate General of Highways managed the 1st disaster rescue drill before Provincial Highway No.9 Suhua Highway Su'ao to Dong'ao Section Improvement project open to the public, (earthquake, system down, car accidents in the tunnel) and the relevant units were invited to the drill and the experts and scholars joined the event and gave instructions.	Highway Disaster Prevention Center
December 27th	The Directorate General of Highways managed the 2nd disaster rescue drill before Provincial Highway No.9 Suhua Highway Su'ao to Dong'ao Section Improvement project open to the public, (Tunnel vehicle evacuation vehicle breaks down, including the fire alarm) and the relevant units were invited to the drill and the experts and scholars joined the event and gave instructions.	Highway Disaster Prevention Center

Budget Execution

1. Budget Execution

(1) Revenues

2017 The DGH had budgeted revenue of NT$7,886,240,000 in 2017, with receipts of NT$9,295,360,000 and accounts receivable of NT$436,990,000 (5.54 percent of budgeted revenue) for a total of NT$9,732,356,000. Execution rate was 123.41 percent.

Previous years The DGH had annual receivables of NT$496,679,000, with receipts of NT$491,449,000 (98.95 percent of annual receivables). The surplus of NT$5,230,000 (1.05 percent of annual receivables) was carried forward to the following year.

Revenues Execution Chart Unit: thousand dollars

This year	Budget (1)	Actual Receipts (2)		Accounts Receivable		Execution Amount	
				amount (3)	Share of Budget (%) (3) / (1)	amount (4) = (2) + (3)	% (4) / (1)
	7,886,240	9,295,360		436,996	5.54	9,732,356	123.41
Previous year	Annual Receivables (1)	Actual Receipts		Transferred to the Next Year's Budget for Execution			
		Amount (2)	Share of Annual Receivables (%) (2) / (1)	Amount (3)= (1) - (2)		Share of Annual Receivables (%) (3) / (1)	
	496,679	491,449	98.95	5,230		1.05	

(2) Expenditures

2017 The DGH had budgeted expenditures of NT$50,228,955,000 in 2017, with payments of NT$48,981,563,000, accounts payable of NT$196,000, treasury payments of NT$47,870,000 (0.1 percent of budgeted expenditures) and suspense payments of NT$416,238,000. Execution rate including suspense payments was 98.44 percent.

Previous years Encumbrances totaled NT $ 5,976,464,000, with payments of NT$3,552,173,000, write-offs and deductions of NT$123,352,000 (2.06 percent of encumbrances), and suspense payments of NT$1,440,970,000. Execution rate including suspense payments was 85.61 percent.

Expenditures Execution chart Unit: thousand dollars

This year	Budget (1)	Actual Payments (2)	Accounts Payable (3)	Treasury Payments		Suspense Payments (5)	Execution Amount	
				Amount (4)	Share of Budget (%) (4) / (1)		Amount (6)=(2)+(3)+(4)+(5)	% (6) / (1)
	50,228,955	48,981,563	196	47,870	0.10	416,238	49,445,867	98.44
Previous year	Encumbrances (1)	Actual Payments (2)		Write-offs and Deductions		Suspense Payments (4)	Execution Amount	
				Amount (3)	Share of Encumbrances (%) (3) / (1)		Amount (5)=(2)+(3)+(4)	% (5) / (1)
	5,976,464	3,552,173		123,352	2.06	1,440,970	5,116,495	85.61

2. Budget Reservation

Expenditures

2017 Budgeted encumbrances totaled NT$1,199,522,000 (2.39 percent of the budgeted amount).

Previous years Budgeted encumbrances totaled NT$2,300,939,000 (38.50 percent of encumbrances).

Budget Reservation chart Unit: thousand dollars

	Budgeted Encumbrances	Share of Budget /Encumbrances (%)
This year	1,199,522	2.39
Previous year	2,300,939	38.50
total	3,500,461	6.23

2017 Annual Report of Directorate General of Highways, MOTC

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