

DIRECTORATE GENERAL OF HIGHWAYS, MOTC

Always Make the Best Road

With an extensive and convenient public road system And multifaceted, people-oriented motor vehicle services We have passed the great centennial milestone Let us all take to the road in joy May every intersection be a launching point for dreams And may we ultimately return home safely

With every segment of our journey having been a happy one



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Convenient Transportation that Moves the Soul

Director General's Preface

2011 was the centennial of the Republic of China, a historical milestone particularly worthy of commemoration. It was a glorious year in the history of the ROC; the nation's government, industries and citizens have now entered the ranks of developed nations, and the entire country enjoys material affluence and a high quality of life. Furthermore, 2011 marked the 65th year that the Directorate General of Highways began making plans for public roadway projects. For both its road projects and motor vehicle services, the DGH earned high marks in the ROC centennial year.

The impressive achievements of the DGH in 2011 have been widely lauded. First of all, it established the Highway Disaster Prevention Center, which focuses on monitoring highways in mountainous areas and highway bridges. The innovative disaster prevention system encompasses river basin management and risk management measures. When it was tested during the flood season of 2011, the center achieved the stated goal of disaster reduction and prevention: no lives or vehicles were lost. In the hope that more people will use Taiwan's highways to reacquaint themselves with the island's magnificent scenery, the DGH also published a travel guidebook: "Bonjour! Highway 9." Also for the first time the DGH held face-to-face talks with the public, where it received suggestions from different perspectives. These ideas will help the DGH take a more comprehensive approach to tackling issues that the public cares about.

Taiwan's public road network is well developed, so the focus of roadway engineering has largely shifted from new construction to maintenance. Because Taiwan faces threats from frequent typhoons and other natural disasters, the main mission of the DGH is to provide the public with a safe journey home. In 2011, the DGH overcame a myriad of difficulties to successfully launch the Suhua Highway Mountain Section Improvement Project, which aims to provide a safe highway for the people of eastern Taiwan. The project also represents the first roadway construction in Taiwan placed under a carbon emissions reduction plan. In the future, reducing carbon emissions in road-building projects will be a priority for the DGH. As a result of engineering difficulties and the great expenses involved, plans to follow up with the South Link Highway Widening Project had long been

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stalled. A breakthrough was finally made in 2011, with a new phase of widening work and other improvements on Provincial Highway No. 9's southern loop. We believe these efforts will prove to be a turning point for overall economic development in Taitung area. Meanwhile, construction work on the Shuangyuan Bridge was finished ahead of schedule, offering greater convenience to travelers between Kaohsiung and Pingtung. The completion of the Urgent Reconstruction of Aged and Damaged Bridges on Provincial Highways, in which 47 bridges were repaired, also represents a major accomplishment of the DGH in advancing personal safety and property.

In terms of motor vehicle services, 2011 also brought significant achievements. To ensure transportation safety, the DGH commenced trials of road tests for new drivers. Also, as a major historical shift, the overall responsibility for motor vehicle services was returned to the DGH. From now on, people throughout Taiwan will enjoy uniform service that is comprehensive and satisfactory. To enhance convenience, online selection of license plates commenced in 2011, local motor vehicle units continue to be open on some weekends, night market service stations continue, and "mobile stations" were deployed. These efforts led to a satisfaction rate of 83% toward motor vehicle services, and motor vehicle personnel had the lowest rate of perceived corruption among all public servants. The public clearly values the DGH's commitment to respectful and attentive service. Furthermore, the DGH continues to promote its public transport development plan for reducing carbon emissions.

The implementation of greater safety, convenience and comfort for Taiwan's travelers has long been the DGH's ultimate goal. We are extremely gratified to have accomplished so much to earn the greater trust of the public during the milestone year of 2011, the ROC centennial. The support from the public constitutes the greatest motivation in prompting us to spare no effort to continue advancing the development of Taiwan's highways. May we all continue to strive toward these goals!

Director General

Men Feng, Wu

A Love for Taiwan Starts on the Roads and Departs from the Heart

Introduction

Roads are the most basic and widespread of transportation infrastructure, and they have the deepest impact. Highways bring together the features of convenience, safety, reliability and seamless transportation, and play an essential role in connecting people and ideas in society.

The DGH is responsible for highway construction and maintenance, and it oversees public transportation management and motor vehicle services. The DGH's greatest mission is to efficiently integrate the four main elements of highway transportation: roads, bridges, people and vehicles, thereby allowing economic development and quality of life to rise from generation to generation. 2011 was the centennial of the ROC and a milestone for the DGH, which celebrated its 65th anniversary. The achievements in road construction and development by the DGH in 2011 were thus especially meaningful.

Roads to the nation are like veins and arteries to the human body. If a body is to function properly, it requires smooth and unimpeded circulation. Similarly, Taiwan is our "life community," and the healthy development of its highway transportation bears direct impact on the quality of life for its residents. Consequently, this annual report has been given the theme of "heart." This report draws together achievements and events of 2011 related to the DGH head office and other units. Special topics, named after Chinese phrases that contain the character for "heart," offer readers a broader understanding of the DGH and its diligent efforts to serve the public and guide the development of the nation's highways.

The first chapter "Intention to Innovation" is based on the idea of lofty inspirations. It looks at innovations introduced by the DGH in 2011 and other important events, including establishment of the Highway Disaster Prevention Center and a reliable flood warning mechanism. For the first time the DGH published a guidebook on highway travel, going deep into the renovated Provincial Highway No. 9 to promote the scenic beauty and the culture it offers. To celebrate the ROC centennial and the 65th anniversary of the DGH, the DGH held an exhibition of its achievements and an athletic event. It also hosted its first public forums to meet with the concerned public face to face and gather suggestions about the development of Taiwan's highways. The 2011 Bus Tour around Taiwan called for the public to travel around the island by bus as a demonstration of their love for Taiwan. This chapter also outlines the breakthroughs that the DGH made in using innovative materials.



The second chapter is titled "Attention to Transportation" and is based on the idea of diligence. Apart from a basic description of the DGH's organizational structure and division of labor, this chapter describes the budget and infrastructure expenditures aimed at stimulating the economy. Statistics related to how the DGH is building and maintaining highways while ensuring road safety and providing motor vehicle services also reflect the hard work and achievements of DGH staff.

The next chapter, titled "Perfection in Construction," focuses on meticulousness. It looks at highway engineering efforts, such as the start of the Suhua Highway Mountain Section Improvement Project and the Follow Up to the South Link Highway Widening Project. It also looks at the reconstruction from the damage inflicted by Typhoon Morakot and the rebuilding of 47 bridges under the Urgent Reconstruction Project of Aged and Damaged Bridges on Provincial Highways. Furthermore, it revisits various bridge and road construction projects undertaken by the DGH that won awards for engineering quality along with work safety and health.

The following chapter, "Consideration for All," uses care as its primary theme. It focuses on licensing and other motor vehicle services. Besides a brief introduction to the fruits of the DGH' s public transportation development plan, the chapter looks at trials for on-road driving tests and efforts to bring motor vehicle services under central control. Finally it examines the high satisfaction levels with which the public views DGH's motor vehicle services.

The chapter that follows, "Assembly of Brilliance," focuses on solidarity. It delves into various topics, including logistics services performed by the DGH, from land acquisition for the Suhua Highway Mountain Section Improvement Project to the record high service satisfaction in 2011, the plan for the third generation of motor vehicle services, and efforts to encourage social participation and highlight the DGH's clean administration. Last year, the DGH was successful in all of these areas.

Finally, the chapter "Prospect for Glory" focuses on jubilation. It reviews the DGH's splendid accomplishments in 2011, and recounts the various honors awarded to the DGH as well as the results of its research.



Intention to Innovation

Create a New Future in the ROC Centennial Year

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Innovative Safety Control from the New Highway Disaster Prevention Center

Extreme global climate conditions in recent years have caused loss of life and financial distress. Previously we thought we could overcome the nature, but that hubris is gone. Instead, people need to accommodate it. The DGH is committed to providing safe and convenient highway transportation, so road users can avoid the destruction that natural disasters cause. A major part of the disaster prevention and rescue efforts includes developing an innovative warning system.

To manage disaster occurrence, the DGH established the Highway Disaster Prevention Center on March 28, 2011. Then on April 30, it selected 64 roads and 48 bridges to be the priority of flood-season monitoring. In 2011, Taiwan was threatened by severe weather six times, and in these storms the DGH achieved its goal of zero casualties.

Watershed Area Management and Risk Management

Highway disaster prevention and warning systems combine watershed area management with risk management. For example, bridge monitoring systems consider the entire watershed area, so when changes are detected upstream at a precipitation gauge site, the information can be relayed to gain valuable warning time downstream. Meanwhile on mountain highways, historical disaster and rainfall records are used to determine areas at risk for extra monitoring. Proactive attitudes replace passiveness so information is transmitted without delay. Prediction and preparation occur before a disaster, reports and rescues occur while the disaster is underway, and repair and rebuilding take place after.



▲ Roads and Bridges for Primary Monitoring



When it comes to disaster prevention, this department focuses on precaution. Rainfall and water observations, forecasts, and the geographic information system (GIS) support decision making, so warnings can be issued for areas at risk. When offices face the need for "deployment," they notify relevant units (such as the Tourism Bureau or local governments) and use location-based service (LBS) messages, changeable message systems (CMS), and news broadcasts to alert drivers. When a reaction is needed, the DGH employs three-phase signals- early warning, alerts, and action- and encourages drivers to use shelter stations. These steps keep drivers away from harm.

Warnings Issued Through Four-Stage Disaster Prevention Were Successful

Safety control in 2011 relied heavily on the Maintenance Offices under the DGH and the Construction Sectors. According to government regulations, these units considered rainfall alert, warning and action levels based on the data gathered from the precipitation gauge sites, monitor water levels and close bridges and roads during the floods. The above information is available on the DGH website (www.thb.gov.tw).



▲ Major landslide at the 178.5-kilometer mark of Provincial Highway No. 8

Intention to Innovation



Taiwan faced six extreme weather conditions in 2011, including extremely heavy rain caused by storm fronts (0512), Typhoon Songda (0527), southwest airstreams brought in by Typhoon Ma-on (0718), Typhoon Nanmadol (0829), the combined effects of Typhoon Nalgae and northeast monsoon (1003), and another bout of extremely heavy rain (1115). During each of these storms the DGH relied on a four-stage disaster prevention mechanism that included precaution, deployment, early warning and reaction. Roads were closed 86 times as a precaution. On 30 of those occasions disasters struck, but the early action prevented casualties.

Also, roads were closed as a precaution before major landslides occurred at the 178.5-kilometer mark of Provincial Highway No. 8 and the 115.8-kilometer mark of Provincial Highway No. 9, thus prevented casualties.

Using Highway Disaster Prevention Info and Customized Rainfall Monitoring Systems

In 2011, the DGH prioritized disaster prevention information. Apart from expanding GIS to assist in decision making, it combined water observation systems and cooperated with the Central Weather Bureau to customize extreme weather monitoring systems. To handle the flood season in 2011, the DGH formed a water management task force to assist in severe weather events. It also carefully monitored rainfall levels at key sections of roads and bridges to implement disaster prevention reporting and warning mechanisms.

Enhancing Drills, Training and Highway Disaster Prevention Equipment

The DGH prepares for the inevitable road or bridge closing during floods by conducting drills and training. Its purpose is to enhance warning and responding capabilities. In 2011 before the start of the flood season (at the end of April), the DGH conducted more than 36 road and bridge closing drills.





▲ Highway Disaster Prevention System



Disaster prevention works best when drivers participate in avoiding danger when rain strikes on mountain roads. To gain their support, the DGH printed highway disaster control posters, and had them posted in the neighborhood offices and public transportation stations across the country. In May 2011 it also began teaching disaster control to professional drivers, tour guides and regular drivers. These ideas were included in the grade 1-9 curriculum by the Ministry of Education, so children could learn highway disaster prevention from a young age.

Another important part of highway disaster prevention is equipment. The DGH improved equipment along the Suhua Highway section of Provincial Highway No. 9, the South Link Highway, and the Alishan Highway section of Provincial Highway No. 18 by installing CMS, CCTV, and ET equipment along with adding more shelter stations and highway control gates. It also established location-based text messaging as part of the Emergency Alert System built with Chunghwa Telecom. When the 3-11 earthquake that struck Japan triggered a tsunami alert, the system was used to quickly send close to 50,000 text messages to people in coastal areas. This telecommunication service was even honored with the 7th Gold Map Awards.

During the 2011 flood season the DGH faced many extreme climate events. Its stage-by-stage approach to disaster control and rescue work before, during and after each event lowered the rate of road users in peril. Meanwhile the training it received during each disaster made system implementation almost second nature.



DGH Disaster Control Procedure

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Promote the Beauty of Highway No. 9 in Travel Guide



Along eastern Taiwan is the island's longest and most beautiful highway, Provincial Highway No. 9. It begins at Taipei's Zhongshan South Road, passes through New Taipei, Yilan, Hualien, and Taitung, and ends in Pingtung's Fenggang. The 475kilometer highway is replete with natural and cultural attractions.

On May 22, 2011, the DGH published a highway travel guide called "Bonjour! Highway 9." Yang Li-chou, the winner of the best documentary director of the Golden Horse Awards, joined the effort by traveling along the highway and recording his experiences.

Connecting the Pearls of Eastern Taiwan

At the book's release, MOTC Minister Mao Chikuo said that Highway No. 9 is filled with meanings. He said it can teach the value of life and is worth a visit from people who place great importance on the quality of life. One of the highway's greatest features is that it connects many of the top landmarks that lie along northeastern and eastern Taiwan. Mao called it a particularly wonderful experience for cyclists interested in nature and culture.



2011 was the 65th anniversary of the DGH and the 100th anniversary of the ROC. DGH Director General Wu Men-Feng discussed how at this momentous time, it is important to remember that many life stories occur on highways and highways have accompanied the Taiwanese people as they grew. The release of the Highway No. 9 travel guide represented a new start for the DGH. Wu said he hopes the book shows how Taiwan's intricate highway network can become a valuable stage for forming new memories.

A Highway Characterized by Four Scenic Sections

Highways carry people, vehicles and life stories. "Bonjour! Highway 9" is arranged into four main themes that gather stories on the exciting landmarks, unique people, and charming villages one encounters when journeying along the highway.





- 1. Beiyi Highway: The section of highway from Xindian to Suao used to be the main road connecting Taipei and eastern Taiwan. The twists and turns one finds on its mountain roads made it famous, and today it is an outdoor playground for cyclists and motorcycle drivers.
- 2. Suhua Highway: Between Suao and Hualien lies the Suhua Highway, famed for its views of the mountains meeting the sea. Its scenery rivals the best highways in the world, and the dangers of driving along its winding roads were reduced significantly following a widening and improvement project finished in 1990. As one follows the highway, the charm of villages like Nanao, Jinyue and Chaoyang is revealed.
- 3. Huadong Highway: The Huadong Highway between Hualien and Taitung passes through the East Rift Valley. Its beautiful and tranquil fields are unforgettable and its landmarks include the Fenglin Tobacco Building, the Chihshang rice paddies, and the golden lilies of Liushidan Mountain.
- 4. South Link Highway: The final section of Highway No. 9 goes from Taitung city center to Pingtung's Fenggang. A particularly striking area winds through Taimali where the road lies between mountains and the meandering Pacific coastline. There is also the Dawu Mountain region which is steeped in aboriginal culture.

Acclaimed for Innovative Highway Promotion

The book received widespread attention upon its release from broadcast media such as PTS, TVBS, and BLTV, and print media such as the Liberty Times, China Times, United Daily News, and Apple Daily. From when it was issued in May 2011 through April 2012, it was a hot seller. Reprints were even necessary. The book's success has led the DGH to begin compiling stories of other provincial highways. These publications not only give people a new understanding of highways but also reveal the DGH's outlook and ideas toward highway construction.





Activities to Celebrate the ROC Centenary and the 65th Anniversary of the DGH

The DGH was founded on August 1, 1946, to oversee highway construction and motor vehicle administration. It turned 65 in year 2011. Throughout these years, the DGH has provided an expansive highway transportation network and caring motor vehicle administration. These efforts make it a behind-the-scenes hero in Taiwan's economic miracle.

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As the DGH turned 65, the ROC also celebrated its centennial. To promote its achievements, the DGH held an exhibition and a sports event for staff. These encouraged members of the DGH to continue providing a first-rate highway transit experience.

A Call for Sincerity and Efficiency from the Premier

The event took place on July 23, 2011, at New Taipei's Sanchong Multipurpose Sports Complex. At the opening Premier Wu Den-yih spoke, thanking the DGH for building a convenient highway network that helps enterprises, stores and individuals advance and develop.

Premier Wu praised the DGH for completing a six-year restoration project on 47 provincial highway bridges in just two years, commending the efficiency and high quality of the work. He encouraged everyone to continue looking for ways to provide even better highway construction and motor vehicle administration

Multiple Activities for a Festive Atmosphere

About 1,820 people, from both inside and outside the agency, joined the event. Activities included: 1. An achievement exhibition with 19 fun displays; 2. A special car show; 3. A mobile motor vehicle office that let people renew their license or vehicular registration on-site; 4. Skits focused on situations that arise at the motor vehicle offices; 5. Competitions where contestants separated into five groups and faced off in cheerleading, teamwork, wheel rolling, cooperation, ring joining, bonanza, and give-and-take games; 6. Parent-child games to strengthen family ties; 7. Stage games and performances; and 8. A food fair with 35 food and beverage stands.





A Fun Exhibition to Show DGH Achievements

The day began with the 100 m race walk by the DGH's director general, deputy director generals, and first-level senior officials, representing that the DGH will continue moving forward under the director general's leadership. Then the games began. Competitors gave it their all while cheerleaders urged them on, showing everyone's commitment to the competition.



Meanwhile at the achievements exhibition, each unit provided interactive games to attract visitors to their stands. Displays that let people better understand the difficulties faced by the highway workers included a model of the Sibin Bridge section of Yuanlin Drainage from West Coast Expressway Central, a computer animation from West Coast Expressway North, a wind alert display from Second Maintenance Office, a realtime road conditions display from Fourth Maintenance Office, and Typhoon Morakot repair records on Provincial Highway No. 18 from Fifth Maintenance Office.

Win or lose, the willingness and discipline highway staff put into their work along with their diligence and caring service mean that their names will be a part of the ROC's highway history. At the end of the event the DGH director general hosted a quiz game. He threw out a ball and recipients had the chance to answer questions regarding 10 highway topics, with correct answers earning the prizes. The finale again showed the caring and compassion of the director general toward his colleagues.

Hold First Highway Fans Conference

For marketing administrative performance, and to express the concern to people's recommendations, on September 30, 2011, the DGH held a "Highway Fans Conference." People interested in highway policies, or who are highly enthusiastic on highway topics were invited to join the discussions.

Different Perspectives to Learn People's Concerns

The director of the MIS started the event by giving opening remarks in Mandarin, Taiwanese and English, rendering it a successful warm-up that earned laughs. The DGH's presentation

focused on four topics of great concern, including convenient information, highway safety and disaster prevention, highway maintenance achievements, and motor vehicle administration achievements.

The director general of DGH asked the presentation of each subject as brief as possible, so most of the time was reserved for the highway fans. These fans prepared two topics: "Starting from Highway Origin Signs to the Entrust Management and Maintenance System of Provincial Highway" and "Highway Signage Problems -Examples and Suggestions." The ppresentations were concise and informative, and the audience erupted in applause when a self-designed Taiwan highway origin sign was used as an ending. The DGH director general clapped enthusiastically while offering words of praise like "amazing" and "wonderful."



▲ Fu Ren-yi: Self-designed Highway Origin Sign



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▲ Detailed Highway Origin Sign (Near the Executive Yuan)



The Search for Highway Culture

The climax of the conference came during the question-and-answer session. The director general encouraged highway fans to give suggestions.

One of the most impressive and creative suggestions came from "Professor Pei," who recommended that people "Walk through provincial highways and take photos with the highway sign that signifies one's birthday." Instructor Yu, known as the "Antarctic Ice Fish," recommended to add more human elements to roads by highlighting the memories, history and culture behind them.

Roads are rigid creatures, but the highway fans offered supple ideas that can give them new life and meaning. The conference proved to be a valuable lesson for students of civil engineering, transportation, and environmental engineering. The lessons they learned provide a more holistic vision for their future planning, design, and construction efforts.

Using Suggestions from Highway Fans

A highway is more than just a means to travel. People also must approve of it and feel as if it belongs to them. When the DGH designs and plans future highways, it will put more thought into the drivers who use them. Those road users will then have beautiful memories of their time spent on driving.

In his closing remarks, the DGH director general said: "When you want to do something, you think of a way. When you don't want to do something, you think of an excuse." Many valuable suggestions were made at the conference by the highway fans, the director general asked to make prudent study evaluation and improvement. And the communication between the two sides will continue. The pursuit of better highways will allow the DGH to achieve the motto written in the hall on the first floor: "A Love for Taiwan starts from the roads."

Intention to Innovation

Organize "2011 Bus Tour around Taiwan " Activity



▲ Foreign Category - "Village Sounds - Taiwanese Folk Songs Journey"



▲ Well-Known Blogger Category - "Margaret + 1"

To celebrate the ROC's centenary, the DGH held an activity called the 2011 Bus Tour around Taiwan. The program called for submissions related to island-wide tours, and asked people to make a bus tour one of their must-do activities during the centenary. Completing such a journey was an impressive way of showing one's love for Taiwan.

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Online registration for the event was available from July 1 to 25, 2011, and results were announced on October 26. MOTC Minister Mao Chi-kuo called promotion of island-wide tours on public transportation a way for long-distance buses to rejuvenate their business. On their journey tourists and backpackers not only had a chance to see Taiwan's local culture up-close but also could better understand people's need for a bus system.

Taiwan's Vitality Held Together by Its Roads

Submissions were accepted from people in four categories, including well-known bloggers, local Taiwanese, youths, and foreigners. Generous awards were provided for the best submissions. The purpose of the program was to go beyond borders to promote a new way of looking at round-the-island road trips. The DGH wanted stories from stations worth a revisit or thoughts on interesting people and objects. Participants could post information about their favorite landmarks, uncover the loving side of the highways, or even test their limits during the ROC centenary.

The DGH suggested that submissions have a story. Camp aesthetics were encouraged, as were those involved in interaction with local culture or the search for stories in bus stations. Selfchallenge was happily accepted, and participants were encouraged to promote public transportation



Results of the 2011 Bus Tour around Taiwan Contest Were Announced on October 26. Winning Teams in the Four Main Categories Accepted Their Prizes from MOTC Minister Mao Chi-kuo (Fourth from the Left).

tours and low carbon, energy-saving ways of travel. Meanwhile the foreign category was added to share Taiwan's beauty around the world, giving more people a chance to see the island.

Seeing Taiwan's Beauty from Different Perspectives

The event ended with winners selected from each of the four categories along with one online favorite. Prizes that worth NT\$290,000 were awarded.

The winner in the well-known blogger category was Margaret, who achieved success on the site Million Blogger. Margaret used the theme "Big Foot and Little Foot Walk to Every Corner of Taiwan," and traveled to five of the island's main corners and four of its high points with her son during the summer vacation. She also posted 100 of their "Margaret + 1" photos on Facebook. By publishing her touching trip, Margaret successfully promoted bus tours and received 313,662 hits.

In the local Taiwanese category the team behind "Cheng-Cheng Challenge 100" proved to

be the winning combo. Their theme led them on a search for 100-kilometer highway markers. When their destination was far from a station, they asked drivers to instead let them off by the markers. On their travels they collected photos from 11 of Taiwan's 100-kilometer markers, each of which is a milestone of the ROC's centenary.

A sister-sister duo relied on a "girl power theme" to win the youth category. They traveled to Tainan's Tugou community, Yilan's Baimi Clog Village, Taipei's Huashan Creative Park, and the Taitung Railway Art Village. Using a homemade magnifying glass and cardboard cutouts themed on different localities as props, they encouraged locals to get in the shots. The 100 photos they took with others provided insight for some of the best parts of Taiwan.

For the foreign category, a Malaysian woman named Lim Chieh-shan won top honors. She used "Village Sounds - Taiwanese Folk Songs Journey" to travel to the places that inspired nine local folk songs. The 12-day trip took her to places like Jiufen's coffee shops, Sun Moon Lake and the Puyuma Homeland in search of the culture and charm behind each song.

The online favorite turned out to be Li Yi-Xuan. Her theme took her to search for colorful names, colorful words, and colorful objects. By asking "What is the color of Taiwan?", Li visited places that have colors in their name. She took photos of billboards and signs with words that signify colors, digging deep for Taiwan cultural stories.

Local Taiwanese Category - "Cheng-Cheng Challenge 100"



Organize Centennial Flood Prevention Experts Panel Conference

On June 27, 2011, the DGH held a conference on safety control. It established new benchmarks for its highway disaster prevention warning system.

Controlling Risk through Complete Watershed Area Management

The conference began with the DGH explaining how safety control measures for bridges include watershed area management, and how highway disaster prevention includes risk management principles. As always there is room for improvement in disaster prevention, so the conference was open to suggestions from experts and representatives of various organizations.

Feasibility of the DGH Centennial Safety Control System

After the conference actual events confirmed feasibility of the DGH's plan to use the deep terrain of watershed areas during typhoons and extremely heavy rain to achieve extra warning and response time. Also owing to the complexity of the terrain and hydrology of mountain highways, coupled with extreme climate changes, no control measure is yet available to eliminate risk. But technology does permit these units to achieve their main goal of lowering the risk of casualties. Highway units applied their limited historical data and experiences to risk management mechanisms to develop a disaster prevention warning system.

DGH safety control action in 2011 was led by the director general while members of each related Construction Sector and Maintenance Office manned their post when flooding

occurred. Taiwan was threatened mainly by typhoons and extremely heavy rain events in 2011, but successful disaster management allowed the DGH to achieve its goal of zero casualties.

Insightful Opinions from Conference Attendees

Experts at the conference contributed many valuable ideas, including a suggestion that DGH use information from the Water Resources Agency's flood warning system when deciding whether to close the bridges. Other recommendations were that the DGH enhance promotion and the use of its located-based service (LBS); build joint monitoring, information and decision-making platforms with other agencies involved in disaster prevention; and research



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bridge-pier stability monitoring techniques, warning technology, and mechanisms for evaluating and strengthening bridge flood resistance. Bridges and mountain highways are a sensitive topic, so the experts suggested a historical review of disasters. Findings could enhance analysis of sensitive areas. Also the distribution of precipitation and hydrology stations is not uniform, so the experts recommended improvements in areas lacking such infrastructure.

For progress to continue, conference attendees encouraged the DGH to invite scholars and experts to form a working committee that could regularly provide suggestions related to disaster management. They also want to see greater communication, including sharing disaster prevention experiences with neighboring countries, providing conference reports to local governments and other agencies, and holding education and training classes.

Using Suggestions Raised at the Conference

The DGH has already begun promoting and implementing the suggestions made by conference attendees. For example, in August 2011 it finished connecting its flood warning system to the disaster prevention center under the Water Resources Agency, providing information on 10 major watershed areas. By working with the National Communications Commission, the DGH built an integrated platform for promoting the LBS alert system. Also by July 2011 it had linked its disaster prevention response system to the Water Resources Agency, the Soil and Water Conservation Bureau, and the Central Weather Bureau, making close communication with these agencies possible. Meanwhile, the DGH has outsourced bridge and road risk management research, plus it has taken steps to mitigate the effects of insufficient precipitation stations. For example, it recruited volunteers who contribute to flood control by using simple precipitation tubes to measure rainfall and built mobile precipitation stations.

Another suggestion the DGH heeded was to form a regular committee to review its disaster prevention management system. And at the APEC transportation ministers meeting that took place in San Francisco on September 12 and 13, 2011, MOTC Minister Mao Chi-kuo shared the DGH's highway disaster prevention experiences. In addition, the DGH has begun teaching disaster prevention to local government officials (at the township, city and district levels).

Intention to Innovation

Establish the Specification Limits of Viscosity for Reclaimed Asphalt

By orders from DGH in September 2010, the Materials Testing Laboratory (MTL) of DGH dealt with establishing the specification limits of viscosity for asphalt reclaimed from Virgin Asphalt Concrete (VAC, the asphalt concrete(AC) blended no recycled asphalt pavement) so as to improve the quality of AC pavement.

The investigation showed that neither the Ministry of Transportation and Communications, Public Construction Commission, National Freeway Bureau, National Expressway Engineering Bureau, nor the Taipei City government required inspecting the viscosity of reclaimed asphalt from VAC. Therefore, there has never been any precedent to be followed. MTL seriously, rigorously and aggressively committed to test the viscosity of reclaimed asphalt at 60°C and to analyze data by statistical method. It began researching a practical mechanism.



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Vacuum Concentrator Used to Reclaim Asphalt



 Viscosity Test on Reclaimed Asphalt at 60°C

Collecting and Testing Samples Progressively

An outline of samples collection and testing methods of this project is shown as follows:

- After VAC has been paved, maintenance offices would utilize a random method to determine 5 locations to obtain samples. Take 2 core specimens at each location. These 2 core specimens would be marked as A and B. One would be sent to MTL and the other sent to a TAF accredited laboratory for testing.
- 2. Wrap each specimen in aluminum foil and warm it in an 110°C oven until it is sufficiently soft and can be handled or separated. Remove the bottom section of each specimen by a spatula for about 0.5 cm thickness to prevent contamination by the prime coat or the tack coat. Break five core specimens up and then mix thoroughly. Obtain a representative sample (about 2.5 kg) from the mixture by the method of coning and quartering. Reclaim asphalt from this sample.
- 3. Use a permitted solvent to disintegrate the test sample. Extracting asphalt from the AC sample by an extraction apparatus which could centrifuge revolve at controlled speeds. Then remove ash from the asphalt solution with a high-speed centrifuge.

- 4. Use a rotational vacuum concentrator with distillation equipment to extract asphalt from the asphalt solution. It's the reclaimed asphalt.
- 5. Determine the viscosity of the reclaimed asphalt at 60°C by a Brookfield Thermosel Viscometer.

Sample Collection and Data Analysis

Between September 2010 and May 2011, Maintenance Offices sent MTL 37 lots of AC-20 VAC and 25 lots of AC-10 VAC. Testing data from MTL was gathered and analyzed with data determined by the five other TAF accredited laboratories. Statistical analysis of all the data was conducted. After the data was discussed in meetings, the report, "The Specification Limits of Viscosity for Reclaimed Asphalt," was completed.

This program included 69 test results of AC-20 from 32 construction projects and 41 test results of AC-10 from 18 construction projects. Results are shown below:

1. Viscosity of Reclaimed Asphalt (AC-20 and AC-10) at 60°C

VAC Types	AC-20	AC-10
Viscosity at 60°C(Poises), Grading based on original asphalt	2000 ± 400	1000 ± 200
Construction projects	32	18
Testing Results	69	41
Average Viscosity of Reclaimed Asphalt Value at $60^{\circ}C$ (Poises)	4,599	2,855
Standard Deviation (Poises)	2,367	925
Ratio of Reclaimed Asphalt to Original Asphalt	2.30	2.86

2. Acceptance Criteria

VAC Types	AC-20	AC-10
Acceptance Criteria	The average viscosity, 4,599 poises, was rounded up to the base number of 5,000 poises. The acceptance criteria were set at 5,000 poises $\pm 35\%(3,250~6,750$ poises) (based on the Public Construction Commission's construction specifications, clause 02966).	The average viscosity, 2,855 poises, was rounded up to the base number of 3,000 poises. The acceptance criteria were 3,000 poises $\pm 35\%$ (1,950~4,050 poises).
When not conforming the Acceptance Criteria	 * Acceptance with price-reduction: As the viscosity of reclaimed asphalt between 5000 poises±35% and 5000 poises±70%, acceptance with price-reduction will be applied. Reduce 1% total price of the lot the sample obtained, as the viscosity is above 35% or below -35% per percentage. * Mill and Re-lay: As the viscosity is beyond 5000 poises±70 %. 	 * Acceptance with price-reduction: As the viscosity of reclaimed asphalt between 3000 poises±35% and 3000 poises±70%, acceptance with price-reduction will be applied. Reduce 1% total price of the lot the sample obtained, as the viscosity is above 35% or below -35% per percentage. * Mill and Re-lay: As the viscosity is beyond 3000 poises ±70 %.

3. Sampling Methods and Frequency: Refer to the DGH's construction specification, Table 02966, Recycled Asphalt Concrete, clause 02966-1.

The MTL of DGH submitted this research report on June 2, 2011. It was discussed by the 2011 task force formed to revise technical regulations contained in the DGH's construction specification. The proposed test mechanism was accepted by the task force and added to the construction specification under testing items as clause 02742. It thereby became an additional DGH testing item for VAC to improve the quality of AC pavement.

Attention to Transportation _____

A Strong Team for Comprehensive Transportation Planning \bigcirc

Attention to Transportation

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Organizational Restructuring

The DGH underwent the following organizational changes in 2011 to meet the changing operational needs.

Year



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Establishment of the Suhua Improvement Engineering Office

There are many problems with the Suhua Highway section of Provincial Highway No. 9. Recognizing the need for safety improvements to give residents of eastern Taiwan a safe, reliable route home, the DGH undertook an improvement project in mountainous area. The project's aim is to provide a superior transportation environment on the east coast that adheres to sustainable development principles. It is a major national infrastructure project, spread out over seven years at a cost of NT\$49.2 billion.

Construction is underway in arduous mountain terrain. Most of the work is focused on bridges and tunnels, with the latter accounting for 60% of construction. To oversee this complicated, challenging task and ensure its timely and smooth completion, the DGH established the Suhua Improvement Engineering Office on March 4, 2011.

Dissolution of the Major Bridges Construction Office and the Southern Region Construction Office for the East-West Expressway

To streamline operations, on March 4, 2011, the DGH dissolved the Major Bridges Construction Office and merged its duties into the West Coast Expressway Northern Region Temporary Engineering Office. Also the Southern Region Construction Office for the East-West Expressway was dissolved on March 31 of the same year and its duties were merged into the Kao-Nan Region Construction Office for the East-West Expressway.

Establishment of the Highway Disaster Prevention Center

The DGH established the Highway Disaster Prevention Center, a first-level office, on March 28, 2011. The center consolidates resources, provides disaster prevention and rescue, and sets traffic control guidelines during long holidays.

Combining Second Level Units

The DGH is responsible for maintaining more than 7,000 km of highway (including county highways it is commissioned to maintain), giving the Division of Road Maintenance an arduous task. For this reason, and to improve worker safety, DGH bylaws were modified to transfer the Division of Road Maintenance's Traffic Construction Unit to the Division of Planning & Design, while the Division of New Constructions' worker safety task force formally became the Worker Safety Unit. To prevent unit inflation, the Division of Planning & Design's Investigation & Survey Unit was dissolved and its duties merged into other units of the Division of Planning & Design. The changes, which took effect on December 3, 2011, brought greater balance to the organizational structure and improved efficiency.

Directorate General of Highways, MOTC Planning Section Engineering Planning Section Traffic Engineering Section Data Section Environmental Engineering Section

Chief Engineer

Chief

Secretary

Genera

Director General Deputy

Directo

Deputy

Director General

Deputy Director General

9 Branches (Miaoli, Taichung, Changhua, Nantou, Second Maintenance Office Guguan, Puli, Sinyi, Yuanlin, Jhuolan) Construction and Design Division 10 Branches (Kaohsiung, Chaozhou, Taitung, Third Maintenance Office Jiasian, Guanshan, Penghu, Fenggang, Cishan, Construction Section Liling, Dongbin) Design Section Contracting Section 7 Branches (Toucheng, Nanao, Hualien 1, Occupational Safety Section Fourth Maintenance Office Luoshao, Dulishan, Yuli, Hualien 2) Maintenance Division 8 Branches (Dounan, Shueishang, Sinying, Sinhua, Maintenance Section Fifth Maintenance Office Tsengwen, Alishan, Chiatai, Yunlin) Engineering Section Management Section Landscaping Section Land Acquisition Division West Coast Expressway Northern Region Temporary Engineering Office 3 Branches (First, Second, Third) Land Deeds Section Right of Way Section Property Section West Coast Expressway Central Region Engineering Office 5 Branches (First, Second, Third, Fifth, Sixth) Equipment & Supplies Division Procurement Section West Coast Expressway Southern Region Temporary Engineering Office Equipment & Supplies Section 3 Branches (First, Second, Third) Kao-Nan Region Construction Office for the East-West Expressway 6 Branches (First, Second, Third, Fourth, Fifth, Motor Vehicles Division Sixth) Planning Section Transportation Management Section Suhua Improvement Engineering Office 3 Branches (Heping, Nanao, Suao) License Section Traffic Safety Section Information Management Office 4 Sections (Foundation Materials, Pavement, Planning & Design Section Materials Testing Laboratory Technical, Supply) Data Management Section Secretariat General Affairs Section 3 Motor Vehicle Stations (Shilin, Kinmen, Taipei City Motor Vehicle Office * Cashier Section Lienchiang) Documentation and Archives Section Research & Evaluation 5 Motor Vehicle Stations (Bangiao, Luzhou, Taipei Motor Vehicle Office Section Keelung, Yilan, Hualien), 1 Substation (Yuli) Public Relations Section Legal Affairs Section 4 Motor Vehicle Stations (Taoyuan, Hsinchu Hsinchu Motor Vehicle Office Personnel Office City, Miaoli, Zhongli) Manpower Section Evaluation, Training and Development Section 4 Motor Vehicle Stations (Taichung, Changhua, Fengyuan, Nantou), 1 Substation (Puli) Taichung Motor Vehicle Office **Compensation Section** Accounting Office 5 Motor Vehicle Stations (Tainan, Yunlin, Madou, Sinying, Chiayi City), 1 Substation (Dongshih) Chiayi Motor Vehicle Office **Budgeting Section** Accounting Section Review Section Kaohsiung City Motor Vehicle Office * 1 Motor Vehicle Station (Lingva) Statistics Section **Civil Service Ethics Office** 4 Motor Vehicle Stations (Pingtung, Cishan, Taitung, Penghu), 1 Substation (Hengchun) Kaohsiung Motor Vehicle Office First Section Second Section Third Section Training Institute 2 Training Centers (Central, Southern) Highway Disaster Prevention Center Note: * Assigned to DGH on January 1, 2012 First Division Second Division

First Maintenance Office

6 Branches (Jingmei, Zhonghe, Zhongli, Hsinchu, Fuxing, Keelung-Fulong Section)

Budget Enforcement

Revenues

Year	Enforcement Circumstances
2011	The year's revenues budget was NT\$12,748,087,000. Actual receipts were NT\$11,478,841,000 and uncollected receivables were NT\$648,929,000 (5.09% of budget), amounting to NT\$12,127,770,000. Implementation efficiency was 95.13%.
Previous FY	Previous fiscal receivables were NT\$701,336,000. Actual receipts were NT\$698,237,000 (99.56% of receivables), uncollected receivables were NT\$2,947,000 (0.42% of receivables), and write-offs were NT\$152,000 (0.02% of receivables), amounting to NT\$701,336,000. Implementation efficiency was 100%.

Year

Expenditures

Year	Enforcement Circumstances
2011	The year's expenditures budget was NT\$27,827,140,000. Actual expenditures (not including suspense payments) were NT\$25,322,600,000, accounts payable were NT\$0, and the amount due to the treasury was NT\$226,762,000 (0.81% of budget). Implementation efficiency including suspense payments was 92.95%.
Previous FY	Encumbrances were NT\$5,599,881,000. Actual expenditures (not including suspense payments) were NT\$3,508,316,000, accounts payable were NT\$0, and write-offs were NT\$326,177,000 (5.82% of encumbrances). Implementation efficiency including suspense payments was 77.75%.

Special Budget for the Economic Revitalization Policy – Project to Expand Investment in Public Works

Year	Enforcement Circumstances
2011	The year's expenditures budget was NT\$16,924,720,000. Actual expenditures (not including suspense payments) were NT\$15,929,104,000, accounts payable were NT\$0, and the amount due to the treasury was NT\$5,040,000 (0.03% of budget). Implementation efficiency including suspense payments was 95.19%.
Previous FY	 2010 encumbrances were NT\$5,799,060,000. Actual expenditures (not including suspense payments) were NT\$4,956,060,000, accounts payable were NT\$0, and write-offs were NT\$277,491,000 (4.79% of encumbrances). Implementation efficiency including suspense payments was 94.91%. 2009 encumbrances were NT\$204,384,000. Actual expenditures (not including suspense payments) were NT\$159,455,000, accounts payable were NT\$21,083,000, and write-offs were NT\$769,000 (0.38% of encumbrances). Implementation efficiency including suspense payments was 90.58%.

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Post-Typhoon Morakot Reconstruction Special Budget

The budget was NT\$21,344,485,000 (implementation from 2009 to 2012), and allotments were NT\$19,309,962,000. Actual payments (including suspense payments) were NT\$13,182,688,000, making implementation efficiency 68.27% of the allotment amount and 61.76% of the budget amount.

Special Budget for the Shihmen Reservoir and Its Catchment Area Management Project

Special budget proposal for second stage work (implementation from 2009 to 2011): The budget was NT\$318,000,000 and allotments were NT\$318,000,000. Actual expenditures were NT\$293,039,000 and the amount due to the treasury was NT\$24,961,000, making implementation efficiency 100% of the budget.

Encumbrance Applications

- * In 2011 encumbrance applications for DGH units totaled NT\$2,277,778,000 (8.19% of the budget).
- * In the previous fiscal year, encumbrance applications for DGH units totaled NT\$1,765,387,000 (31.52% of the budget).
- In 2011 encumbrance applications of the Special Budget for the Economic Revitalization Policy Project to Expand Investment in Public Works totaled NT\$990,575,000 (5.85% of the budget).
- In 2010 encumbrance applications for the Special Budget for the Economic Revitalization Policy Project to Expand Investment in Public Works totaled NT\$565,505,000 (9.75% of the budget).
- In 2009 encumbrance applications for the Special Budget for the Economic Revitalization Policy Project to Expand Investment in Public Works totaled NT\$44,160,000 (21.61% of the budget).

The accumulated total of the above encumbrance applications transferred to 2011 was NT\$5,643,405,000 (10.05% of the budget and encumbrance amount).

Year Administrative Performances

2011 Administrative Projects

Project Name	Annual Budget (NT\$1,000)	Timeframe (Years)	Supervisory Level
Taipei County Special Highway No. 2 Construction Project	2,110,000	2001-2012	Executive Yuan
West Coast Expressway Construction Follow-Up Project	5,700,000	2009-2017	Executive Yuan
East-West Expressway Construction Project and Network Improvement Project	3,190,000	2009-2016	Executive Yuan
Provincial Highway Dangerous and Bottleneck Section Urgent Improvement Project	3,428,000	2009-2012	Executive Yuan
Shihmen Reservoir and Its Catchment Area Management Project - Environmental Preservation	138,000	2006-2011	Executive Yuan
Provincial Highway No. 2C Construction and Improvement Project	645,500	1994-2013	Ministry
Provincial Highway No. 9 Suhua Highway Mountain Section Improvement Project	500,000	2010-2017	Ministry
Provincial Highway No. 9 Huadong Highway Third Stage Improvement Project	640,400	2008-2012	Ministry
East-West Expressway Dongshih/Chiayi Line Dongshih - Puzi Section Construction Project	715,900	2006-2012	Ministry
East-West Expressway Beimen/Yujin Line Sun Yat-sen Freeway - Provincial Highway No. 1 Section Construction Project	598,100	2003-2011	Ministry
Region Based Road System Construction Project (Highway System)	3,422,558	2009-2014	Ministry
Provincial Highway Bridge Construction to Accommodate River Management Planning	1,200,000	2009-2013	Ministry
Local Government Aged and Damaged Bridge Refurbishment Project (Second Stage)	1,446,000	2010-2012	Ministry
Improvement Project for Dangerous Sections of County/ Township Scenic and Tourism Roads	850,000	2010-2011	Ministry
Highway Public Transportation Development Project	3,962,330	2010-2012	Ministry
Energy Saving/Carbon Reduction Model Project for a Bicycle Network in Eastern Taiwan	196,720	2009-2012	Ministry
Provincial Highway Urgent Construction Project for Earthquake Resistance Strengthening of Bridges	2,300,000	2009-2014	Ministry
Central Cross-Island Highway Provincial Highway No. 8 and Provincial Highway No. 8A Guguan-Deji Access Road Project	350,000	2008-2011	Autonomous Management
Provincial Highway No. 11 East Coast Expressway Improvement Project	416,100	1993-2011	Autonomous Management
West Coast Expressway - Budai Harbor, Nanhang Bridge, and Wuqi Ramp Construction Project	237,000	2008-2011	Autonomous Management
Highway Construction Comprehensive Planning and Design	100,000	2011	Autonomous Management
Intelligent Transportation Systems - Real-Time Road Condition Data Transmission Platform, Development and Application Promotion	72,000	2008-2011	Autonomous Management
Highway Maintenance Project	5,891,262	2011	Autonomous Management

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Completed Roads Opened to Traffic

- * New and Renovated Expressways 21.668km
- * Freeways/Expressways Integrated with Local Roads 32km
- * Other Provincial/County Highway Renovation Projects 24.676km
- * Provincial Highway Dangerous and Bottleneck Section Renovations 4 Areas
- Provincial Highway Urgent Earthquake Resistance Strengthening of Bridges - 47 Bridges
- * Improvement to Dangerous Sections of County/Township Scenic and Tourism Roads - 83 Areas





Roadside Inspection Data

	2011	
Sh	8,634	
Staff o	18,651	
	Intercity Buses	37,398
Vehicles Stopped and Inspected	Tour Buses	96,432
	Other Vehicles	203,946
	Total	365,061
	Intercity Buses	527
Citations	Tour Buses	1,038
	Other Vehicles	21,918
	Total	23,483

Mobile Motor Vehicle Services

Taipei MVO		Hsinch	nchu MVO Taichung MVO Chiayi MVO Kaohsiung MV		ing MVO	Total					
Served	Trips	Served	Trips	Served	Trips	Served	Trips	Served	Trips	Served	Trips
18,906	86	7,203	58	59,742	321	66,410	251	7,507	48	130,484	798

Perfection in Construction

Maximize Construction Efforts for a Convenient and Comfortable Highway Network \odot

Integrated Planning for Highways in Taiwan

Perfection in Constructior



Highways affect the national economy and people's life. Because they are a vital part of a country's development, the DGH seeks to build a multifunctional highway system that satisfies various needs. It considers a region's environment and its future development needs to formulate the optimum construction plan.

Adhering to Sustainable Development and Environmental Protection

Strategy for national spatial development in Taiwan is focused on production, living and ecology. Manufacturing includes airports and harbors along with industrial parks. Its focus is on speed. Lifestyle comprises building a regional core to offer access to relaxation and entertainment. Its focus is on leisure. And ecology includes mountains and coastal areas. Its focus is on tranquility. The defining feature of highways is their connection to a country's industrial and economic development along with people's benefits.

Future highway construction must foster manufacturing while considering lifestyle and ecological needs. It must promote the country's well-being by developing not only green transportation but also the economy and industry. Only then can it achieve sustainable development that saves energy and reduces carbon emissions.

 Stronger Land Preservation Principles: Safe maintenance and management take priority over new roads and expansion projects for highways located in the Central Mountain Range Preservation Corridor and the East Coast Life and Industry Corridor. The same priorities apply to highways along slopes and mountainous regions or coastal areas and estuaries. Perfection in Construction
- Creating a Green Transportation Environment: Green transportation include walking, cycling and public transportation. The DGH is committed to building a transportation environment that values all three to achieve its goals of saving energy and reducing carbon emissions.
- 3. A Solid Foundation for Industrial and Economic Development: Important future development plans must include transportation demand models to find ways of reducing congestion and travel time. Logistics need to become better and faster, making freight more competitive, raising efficiency, and increasing flexibility of the overall highway system.

Highway Planning Appropriate to Each Location

Development targets are established based on national planning demands and the local environment. Improving bottlenecks, completing road networks and raising efficiency are of prime importance.

- 1. The freeway and expressway network in western regions is almost complete. Future development should focus on finishing the road network, improving bottlenecks and raising efficiency. In particular, links to the West Coast Expressway need to be finished so it can serve as a primary shipping route and freeway detour, and work must gradually continue to turn the unfinished East-West Expressway into a chessboard-like expressway network. Meanwhile, better transportation management should raise the efficiency of the overall highway system.
- 2. Sustainability and the tourism industry are of primary importance in eastern Taiwan. Development is focused on safe and reliable ways of improving highway links to outside regions, such as the Suhua Highway and the South Link Highway, while adhering to landscape preservation.
- 3. In environmentally sensitive regions, extra consideration is placed on reducing excavation. Green building methods and carbon neutrality principles are followed as planners search for a balance between keeping highway lanes to a minimum while serving basic transportation needs.
- 4. Maintenance is a continuous effort for the DGH. It considers needs and feasibility when conducting localized improvements, such as stabilizing embankments or widening roads to increase space between oncoming traffic. These improvements enhance disaster prevention capabilities and driving safety.

Progressive Highway Maintenance and Improvements

Incremental development is a primary principle of maintaining and enhancing roads. Improvements are sequential, with attention first placed on the management of traffic construction. Next comes road expansion and widening, followed by building new roads.

Highway Improvements Made in Stages

Comprehensive planning is used to formulate year-by-year, stage-by-stage plans for provincial highway improvements and construction. Elements include determining the condition of the overall land transport system and the regional land transport system. Analysis and forecasts of the transportation needs models are considered, as are selection standards for roads awaiting improvements; research and planning of improvement methods; the sequence of roads to be improved; explanations of specially designated improvements; planning position analysis; cost responsibility principles; and execution methods.

Implementation of first stage plans is expected to take place from 2013 to 2018. A report was delivered to the MOTC in December 2011, and future development awaits approval and direction of the overseeing authorities.

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Launch of the Suhua Highway Mountain Section Improvement Project

The Suhua Highway is the only highway connecting eastern and northern Taiwan. Most of the mountainous route was built following extensive drilling along the coast. Over the years extensive wind erosion and torrential rain from typhoons have caused severe damage to embankments, leading to frequent landslides that disrupt traffic and sometimes even cause loss of life. The situation causes significant risks and pressure for residents in eastern Taiwan; therefore, immediate action is needed to build a safe road.

Giving Citizens in Eastern Taiwan a Safe and Reliable Road

There is a strong demand among residents in eastern Taiwan for a "safe road home." The MOTC tasked the DGH with inspecting and improving mountainous sections of the Suhua Highway (Suao to Chongde), making it responsible for researching and planning the Provincial Highway No. 9 Suhua Highway Mountain Section Improvement Project. Targets of the project include raising safety and resisting disaster. Different improvement measures were proposed for different sections of roads, to devise an appropriate plan of just the right scale. A feasibility assessment report was approved in principle by the Executive Yuan on February 24, 2010, and the Environmental Protection Administration conditionally passed the project's environmental impact assessment on November 9, 2010.



The Executive Yuan approved the Suhua Highway Mountain Section Improvement Project on December 16, 2010. Its budget was NT\$49.2 billion, including NT\$1.954 billion in compensation fees for land acquisition and relocation, along with NT\$47.246 billion in construction fees (which includes NT\$1.85 billion in land transport fees coordinated with the Taiwan Railways Administration). The construction timetable was to last from 2010 to 2017. The section between Suao and Dongao was scheduled to be completed and opened to traffic in 2016, with the rest of the project finished in the following year.

Overall Project Goals

- 1. Provide residents in eastern Taiwan with a safe and reliable route connecting to the north.
- 2. Follow sustainable, environmental construction values.



- 3. Adhere to national development and planning strategies for eastern Taiwan.
- 4. Turn the Suhua Highway into a scenic corridor in harmony with the land.

Renewal or Improvements Based on Road Conditions

The project adheres to the two-lane standard typical of provincial highways. It gives priority to replacing three sections of the highway: Suao-Dongao, where the geology is poor and the rate of traffic accidents is high, along with Nanao-Heping and Hezhong-Daqingshui, where falling stones and landslides are relatively frequent. Only small-scale improvements to bends and embankments will take place on the Dongao-Nanao section. The section between Heping and Hezhong is in good condition, so it is outside of the improvement project. Overall, the project calls for improving 38.4 km of highway, including 6.8 km of normal road, 8.2 km of bridges and 23.4 km of tunnels.

New Engineering Office to Oversee Improvement Project

The DGH established the Suhua Improvement Engineering Office on March 4, 2011, to carry out the Suhua Highway Mountain Section Improvement Project. Bridge work near Heping (B4) began on March 21 followed by Gufeng Tunnel (B3), Guanyin Tunnel (B2), and the Wuta section in Nanao (B1). The entire project was divided into nine tenders, with half of them underway.

The groundbreaking on the Suhua Highway Mountain Section Improvement Project took place in 2011. It was the start of building a safe route home for residents in eastern Taiwan.

- 1. Foreign experts were invited to give suggestions at two technology forums. These ideas were used as reference for the design and construction along with future management and maintenance.
- 2. A task force was formed to coordinate the Suhua Highway Mountain Section Improvement Project. Industrial, governmental and academic figures joined to share ideas.
- 3. Another task force was formed to monitor environmental protection during the Suhua Highway Mountain Section Improvement Project. It oversaw safety, water discharges, and air and water pollution. The task force was also responsible for ensuring the preservation of ecological and cultural resources.
- 4. The DGH joined the Safety Partnerships Program launched by the Northern Region Inspection Office of the Council of Labor Affairs. Under the program it is cooperating to reduce occupational accidents, and it has set a goal of zero casualties during the Suhua Highway Mountain Section Improvement Project.

The project passes through beautiful mountain in the eastern Taiwan and lead to a safe road. It will give people the chance to enjoy the pulsating beauty of eastern Taiwan on a shorter route. During construction, the DGH is protecting the natural ecology. It strives for the project to be in harmony with the natural environment, so the Hualien and Taitung areas can advance in a stable manner.

New Ideas of Workplace Safety for a Better Suhua Highway

The DGH's Suhua Improvement Engineering Office subscribes to the idea that "safe building practices are needed to bring happiness to those who travel." To adhere to the MOTC's objective of providing a safe road home in the Suhua region, the DGH signed on to the CLA Northern Region Inspection Office's Safety Partnerships Program on December 27, 2011. During the following two years, it has been taking steps with the office to ensure workplace safety, including:

- 1. Combining workplace safety resources for cross-agency inspections and accounting
- 2. Cooperating on inspections through the Safety Partnerships
- 3. Establishing a workplace safety performance review system
- 4. Managing contractors and training inspection and accounting staff
- 5. Setting standard working procedures for each work process
- 6. Forming a "three-in-one" system that covers training, certification and contracting projects



Respect for Life as Guidelines of Workplace Safety

By agreeing to cooperate with the CLA unit, the DGH hopes to improve its workplace safety standards and management processes. It will link construction and workplace safety while building a common platform for sharing achievements. A comprehensive approach will stamp out occupational accidents as authorities improve techniques for managing workplace safety and work teams increase their knowledge of workplace safety issues.

The directors of the DGH's Suhua Improvement Engineering Office and the CLA's Northern Region Inspection Office signed the Safety Partnerships declaration. They invited the directors of the DGH and the CLA's Department of Labor Inspection to serve as witnesses at the signing ceremony. These two senior officials discussed how "respect for life" is the first step of a stable construction project, whether it is big or small. They expressed hope that the work teams and the officials behind the Safety Partnerships cooperate to ensure that the project progresses safely and smoothly.

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Post-Typhoon Megi: Strengthening Driver's Safety on Suhua Highway

Typhoon Megi formed on October 13, 2010, in the waters near Guam. It developed into a super typhoon. At the time Taiwan already faced heavy rains from northeast seasonal winds. These combined with the typhoon to cause severe flooding in the Lanyang Plains. Effects were particularly strong in Suao Township. On the Suhua Highway of Provincial Highway No. 9, meanwhile, there were major landslides between the 104- and 117-kilometer markers. The roadbed was even washed away. Twenty-six people died (including 20 mainland China tourists), making it the deadliest natural disaster to strike the Suhua Highway since its opening.

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Introspection Leads to New Driver Safety Measures

To prevent dangers to infrastructure, private property or human life caused by natural disasters, urgent measures were needed to stabilize the highway. Damaged infrastructure had to be repaired immediately to prevent the disaster from expanding.

The DGH's Fourth Maintenance Office enhanced its review of the severe disaster on the Suhua Highway. It strengthened driver's safety on the road and ensured that highway maintenance was sufficient for unobstructed transit. In addition, it raised its responding and rebuilding capabilities

Assistance to Overcome Potential Disasters

The Fourth Maintenance Office negotiated with the relevant units to gather assistance. Results include:

- Police Broadcasting Service: The office requested that the Police Broadcasting Service immediately pass information to listeners about the Suao-Dongao section of the Suhua Highway along with reports of potentially severed or closed roads due to typhoon-induced landslides. It also asked the service to publicize the 23 emergency parking areas to avoid disasters.
- 2. River and Forestry Units: The office requested that river and forestry units clear river paths of silt and maintain forests on road embankments. When it was not possible for the units to complete these tasks, they were asked to report to the office. The office also solicited information on water levels during typhoons and discussed the borrowing of tetrapods.





3. Power and Telecommunications Units: The office asked power and telecommunications units to fix electricity problems and electrical poles. Meanwhile it solicited help from support units such as the police and the firefighters, the Tourism Bureau, local governments (Engineering Offices), health agencies, and township and village offices (Construction Sectors).

In 2011 the DGH also held disaster prevention training classes. It conducted numerous drills, and during flood-control period it employed the Highway Disaster Information System (also known as bobe) for early response. In addition, the DGH effectively deployed its precautionary road closing system, achieving its goal of zero casualties.

Excellent Year-End Reviews for Disaster Prevention

In 2011 the DGH took 19 steps to improve driver' s safety on the Suhua Highway, including: 1. Used information from central government agencies to assist in disaster prevention, 2. Strengthened water management and warning mechanisms in disaster prevention through rainfall level monitoring (together with the Central Weather Bureau) and entrance monitoring, 3. Used a location-based service (LBS) text messaging system to provide immediate road condition information, 4. Used content management systems (CMS) to provide immediate road information (11 in total), 5. Monitored 73 CCTV cameras, 6. Supplied 21 emergency telephones, 7. Supplied 23 emergency parking areas, 8. Added 100-meter markers, 9. Strengthened patrols and rescue personnel/equipment on-call, 10. Selected nine areas to serve as checkpoints, 11. Improved embankments, 12. Procured labor for traffic monitoring and information management, 13. Assisted the Police Broadcasting Service with road reports, 14. Set up same-channel relay stations and radiating cables in tunnels, 15. Established 24-hour security in key ares, 16. Added slope monitoring facilities at 115k + 900; established a disaster prevention warning system; 17. Recruited flood control volunteers; 18. Conducted disaster coordination drills; 19. Promoted driver safety education.

Early Benefits of Improving Driver's Safety on Suhua Highway

- 1. Improving Driver's Safety: Early road traffic information and precautionary road closings prevented and reduced the impact of disasters.
- 2. Saving Resources: Prompt repair of facilities saved resources.
- 3. Avioding Expanding Disaster: When disasters happen, staff can quickly reach the scene to put up warning signs and prepare safety equipment, preventing additional dangers for drivers.
- 4. Keeping External Road Links Unhindered: When a disaster happens, staff keep close track of changes. They quickly remove road impediments to keep traffic unhindered.

Carbon Management during Road Construction

Disasters caused by extreme weather events are on the rise, making greenhouse gas emissions a global concern. Emerging trends include taking greenhouse gas inventories and finding ways to reduce emissions.

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For a reasonable determination of carbon emissions, international carbon management is gradually moving from organizational carbon inventories to full life cycle carbon footprints. In the future Taiwan will try to move toward carbon neutrality by striking a balance between emissions and reductions. This would ensure sustainability.

DGH Becomes a Pioneer for Carbon Management of Infrastructure Projects

The Environmental Protection Administration encourages carbon footprint inventories and provides guidance, but it focuses on consumer products. It has not established a management procedure for development projects (such as infrastructure). Taiwan has also not begun taking inventory of carbon emissions from construction.

Every year Taiwan invests close to NT\$500 billion on infrastructure, with a large portion spent on transportation projects. For example, in 2009 transportation projects accounted for about 50% of total infrastructure spending. Transportation infrastructure requires long work periods along with extensive manpower and physical resources. After the work is finished, the infrastructure is used for many years. Its life cycle carbon emissions greatly affect the economic development.

In response to the government's call for low-carbon emissions in infrastructure projects, the DGH considered the experience of the United Kingdom, Sweden and the United States. In 2011, it researched and drafted a carbon management framework and mechanisms for transportation infrastructure along with measuring tools. These ideas and equipment are applied to make carbon management a part of the planning and management of road construction. The entire life cycle of the road is considered. During the planning and designing stage, planners estimate emissions, formulate strategies to reduce carbon, and evaluate the potential benefits of leaving a lower footprint. During the construction stage and when managing the finished road, officials encourage inventories of carbon emissions.





Carbon Management First Applied to Suhua

The DGH decided to test its carbon management ideas for road construction on the Suhua Highway Mountain Section Improvement Project. The first stage of work involved estimating total carbon emissions that would result from the construction. Qualitative explanations and quantitative estimates were used to draft carbon cutting methods for construction and to run a benefits analysis. The DGH then included ideas related to carbon emissions and reduction in the design.

Following the carbon emission and reduction estimates, the DGH turned its attention to the next stage - planning the carbon footprint inventory for adoption during construction. Using international standards, processes and methods, the DGH is formulating an organizational management framework for conducting carbon inventories during road construction. The framework will be used to determine the carbon inventory plan applied to the Suhua Highway project. Inventories will take place on each bid and each year.

There are many benefits of taking carbon footprint inventories during construction. Besides international certification that would directly show Taiwan's carbon management achievements in road construction, even better, the data can be used to modify methods for estimating carbon emissions. This would improve accuracy of estimates calculated during the planning and designing process, making overall carbon management in road construction more effective.

Catalyst for Green Construction

The DGH plans to make valuable use of the carbon emissions estimates and inventories it collects during the planning, designing, construction and management of the finished road. This data along with subsequent analysis will confirm the major carbon emission sources during the life cycle of road construction projects. The results will show the effectiveness and value of energy saving and carbon cutting measures.

The construction industry is responsible for about a quarter of Taiwan's carbon emissions. Applying carbon management to road construction can make carbon footprint inventories and emission controls a priority in related industries, such as steel, concrete, and equipment manufacturing. Better management in one industry could lead to energy saving measures and carbon reduction in that industry's entire supply chain.

Follow Up to the South Link Highway Widening Project

The South Link Highway on Provincial Highway No. 9 connects Taitung and Fenggang. It is the main road linking Taitung to Kaohsiung and Pingtung regions. The section of highway near Taitung was built along the Pacific Ocean and the Central Mountain Range. Its tapering peaks and majestic ocean are what gives the South Link its beauty.

These features present problems, however. Constraints due to the topography and the geology result in narrow roads in some places, which affects driving safety. Torrential rain frequently causes damage and impedes traffic. For years residents in eastern Taiwan have longed for a safe and reliable road



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 The South Link Highway Widening Project Has Been an Important Undertaking for the DGH.

connecting to other regions. They want a safe passage for emergency relief and rescue in time of disaster, which is why public opinion has constantly pushed for additional work on the South Link Highway Widening Project.

Follow Up to South Link Highway Widening Began in 2011

Improvement to the South Link Highway is a difficult and costly proposition. After extensive planning and assessments, widening and improvement gradually begun from 1995. The starting point for the work was Taitung County at Taimali Township's Sianglan Village (Provincial Highway No. 9 407K+264), and it extended 40.6 km to Pingtung County, at Shihzih Township's Caopu Village (Provincial Highway No. 9 458K+700). Progress started to gather steam when the feasibility assessment for the widening project was approved by the Executive Yuan in 2004, and the environmental impact statement was completed in July 2008. The statement was delivered to the Environmental Protection Administration for preliminary reviews; after five reviews it finally passed with conditions on September 20, 2010.

Impetus for widening the South Link Highway came in 2009, when Typhoon Morakot caused severe landslides that blocked sections of the road. In June 2011, the DGH again submit a proposal for additional follow-up to the Council for Economic Planning and Development. The Executive Yuan approved the proposal on July 27, 2011.

Widening and Improvements on 3 Sections of Road

Widening and improvements to the South Link Highway were proposed for three main sections of road:

- Sianglan to Daniao/Sianglan to Jinlun (407K+264~412K+400): Total length 5.136 km. Topographic features limit widening to three lanes.
- 2. Sianglan to Daniao/Jinlun to Daniao (412K+400~432K+180): Widening to four lanes. Work is finished on the first 5.76 km, and the total length designated for improvements is 14.02 km.

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 Anshuo to Caopu (443K+000~458K+700): Curved sections of road will be straightened, and renewed areas will be converted to four lanes. Distance will decrease from 15.7 km to 11.006 km (consisting of 5.02 km of tunnels, 2.23 km of bridges, and 3.756 km of embanked road).

Planning a Scenic Road Replete with Local Culture

Totem drawings will be added to embankments to infuse roads leading to aboriginal villages with attractive local imagery. Also, the environmental impact assessment required that certain work items be finished prior to the construction. Those that started in March 2011 included the assessment of beach nourishment planning, the research on ring-necked pheasants, and the environmental monitoring.

Priority Given to the Sianglan Widening

The budget for the South Link Highway Widening is NT\$19.039 billion. Work is scheduled to take place over seven years (2011 to 2017) to accommodate construction of a 5-kilometer-long tunnel, which will require six years to build. The tunnel is scheduled to open before the end of 2017.

Priority was given to the embankment road widening project on Provincial Highway No. 9, from 407K+264~408K+140. It lies along the two-lane section of road from Sianglan to Jinlun (407K+264~413K+270), which will be expanded to three lanes. The contract was awarded in December 2011 and construction began on January 3, 2012.

Progress to Meet Expectations

The South Link Highway is the only road in Taitung region that connects to western Taiwan from the south. It is a vital external link for the transport of staple goods and resources. The road is a major part of transportation networks in the region and plays a significant role in local development.

To ensure a safe passage for local residents, the DGH will increase efforts to complete the South Link Highway Widening Project early. Improving the road will also help Taitung promote its beautiful scenery and abundant agricultural goods, which will give industries in eastern Taiwan more opportunities for transformation and development. These advantages will mean faster industrial and economic progress for Kaohsiung, Pingtung and Taitung regions.



Highway Widening (Sianglan to Dawu)

Progress in Typhoon Morakot Reconstruction Projects

Starting the day before Father's Day in Taiwan on August 8, 2009, Typhoon Morakot pummeled the island for 72 hours, dumping as much as 2,633 millimeters of rain in places. Besides local records, it came close to the world record for rainfall over 24 and 48 hours. Roadbeds were washed away, impeding transit. The worst moments came when the deadly landslides struck, killing 673 people, leaving 26 missing, and causing agricultural losses of over NT\$19.5 billion.

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Quickly Opening Isolated Mountainous Areas

In Typhoon Morakot, technical demands and the need to reopen transit channels surpassed the knowledge and experience gained from all of Taiwan's previous disasters. After the typhoon passed, rains still raged. Mountains remained clouded in the fog that kept visibility to fewer than 10 m.

Facing such adversity, the DGH did everything it could to reopen roads. On August 22 it first opened the South Link Highway on Provincial Highway No. 9. Later, it continued road repairs to reduce "isolated islands." Finally on November 30 it opened the section of road between Hsiaolin and Namasia, clearing the last of the isolated zones.

Repair and Rebuilding Work Is Underway

Typhoon Morakot dramatically changed the topography and terrain of mountainous areas. Landslides covered 51,200 hectares, equivalent to twice the size of Taipei. More than 1.2 billion square meters of earth loosened, equivalent to the volume of 650 Taipei 101s. Such devastation led to major transportation needs. As the DGH rebuilt infrastructure, it added a new stage between reopening roads and repairing them. It was called "mid-stage improvements." Part of it involved improving flood resistance of makeshift roads and bridges.

The budget for repairing and rebuilding the road network damaged by Typhoon Morakot was NT\$24.934 billion. There were 297 bids awarded for rebuilding provincial highways and 671 for county and township roads. On October 10, 2011, the DGH received the Executive Yuan's approval to draw the first round of the Reconstruction Council's budget provisions. After internal spending adjustments, total funds were NT\$2.023 billion for 10 provincial highway rebuilding projects. In December 2011 the second round of budget provisions worth NT\$992 million was approved for 18 provincial highway projects. Each of these jobs is underway.





A New Shuangyuan Bridge to Solve Kaohsiung-Pingtung Transit Problems

Shuangyuan Bridge, between Kaohsiung County's Linyuan Township and Pingtung County's Hsinyuan Township was destroyed by the typhoon. The effects on traffic disrupted tourism, culture, aquaculture and farming. After the disaster, the DGH did not want to see local residents shoulder the extra costs of driving 28 additional kilometers between the townships. Besides placing a temporary steel bridge where the original structure was, it began to build a new long span steel bridge upstream of the old bridge's site. The new bridge opened on December 24, 2011.

Goals for the new Shuangyuan Bridge included reducing work time, increasing the water flow area, cutting carbon, saving energy, and decreasing waste. These considerations led to the long-span steel design, which emits less carbon than traditional RC bridges, reduces concrete and gravel use, and cuts the work period to two years (the original timetable was for three years). The new design increases water flow area by using 10 piers at a distance of up to 120 m from one another, compared to the old bridge which used 67 piers at a distance of 31 m. Waste was also reduced. Final touches included incorporating local ideas into the protective barriers, light posts and entryways.

Sinfa and Liouguei Bridge Offer New Hope

When Typhoon Morakot caused the Laonong River to overflow, landslides destroyed the Sinfa Bridge. China Steel responded by raising NT\$500 million to rebuild the bridge as a generous act of social responsibility. The new Sinfa Bridge stretches 465 m and has six piers, including two abutments. It is a unique part of the landscape that increases tourism opportunities while improving transportation and road quality between Liouguei Township and Baolai/Taoyuan. It has also spurred local economic prosperity.

The Liouguei Bridge, meanwhile, crosses over Laonong River to connect the Southern Cross-Island Highway (Provincial Highway No. 20) to Cishan/Meinong region. Because the bridge foundation is exposed and floodwaters pass close to its surface, each year when typhoons bring torrential rain that raise water levels, the bridge is closed. Therefore, when planning the new bridge the DGH focused on safety. It also improved the appearance of the bridge's protective barriers and added lighting, producing a brand new look.

Post-Morakot Progress in Repairing Provincial Highways No. 20, 21

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Typhoon Morakot severely damaged the provincial highways managed by DGH's Third Maintenance Office. Bridges on Provincial Highway No. 21 (Namasia-Wulipu) and Provincial Highway No. 20 (Taoyuan-Siangyang) were marred or destroyed. Long-term rebuilding plans were formulated for these two sections of road, and the Third Maintenance Office set a goal of executing the work by the end of the year. Hard work by each of the maintenance office's Construction Sectors and Offices allowed this goal to be reached.

Typhoon Morakot's Record Destruction of Highways

Typhoon Morakot made landfall in Hualien on August 7, 2009. For the next 72 hours it dropped up to 2,500 mm of rainfall on some places, destroying bridges and roadbeds while unleashing landslides. Transit routes were severed.

Areas cut off from the outside included Taitung's Taimali, Dawu and Haiduan townships along with Pingtung's Wutai, Liouguei, Taoyuan, Jiasian and Namasia townships. Particularly heavily hit was Provincial Highway No. 21 (Jiasian-Hsiaolin-Namasia), Provincial Highway No. 27, Provincial Highway No. 27A, Provincial Highway No. 20 (Liouguei - Laonong -Meishan), and Provincial Highway No. 20 Southern Cross-Island Highway (Jiasian - Yakou). On these sections of road, which are all overseen by the Jiasian Construction Office, 44 bridges were destroyed and roadbed gaps formed in 163 locations. On other roads (Provincial Highways No. 3, 28, 9, 17 and 24), 49 bridges were destroyed and roadbed gaps formed in 196 locations.

Short-, Mid-Term Repairs Followed by Long-Term Rebuilding

The damage to Provincial Highways No. 20 and 21 was severe. Planned and gradual rebuilding was the only way to proceed. First came the urgent repairs to restore basic transit needs, which were completed in December 2009. Next came mid-term urgent repairs, including improving the disaster resistance of makeshift roads, raising and strengthening these roads, and changing from river-spanning culverts to temporary steel bridges. As planned, these tasks were completed in 2010. The main goals of long-term rebuilding in 2011 included:





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- Work was finished on Side Bridge and Nanzihsian River Bridge, between Jiasian and Namasia on Provincial Highway No. 21. Also bids were awarded to repair or rebuild five bridges in Namasia (Dakanuwa, Minsheng, Gongyuan, Minzu and Minquan) and five roadbed sections.
 - 2. On Provincial Highway No. 20, between Jiasian and Taoyuan, repairs were made on seven tenders (covering nine bridges: Jianshan 1st, Jianshan 2nd, Lumao, Bingtsai, Talalalufu, Wannian, Shengjing, Taoyuan 1st, and Sala-awu bridges). A roadbed section was also repaired. Meanwhile a dozen tenders to repair the roadbed from Fuxing to Yakou on Provincial Highway No. 20, 103K+000~149K+795 were handed out by the end of the year.

Continuing Roadbed and Bridge Repairs

Contracts under the second round of budget provisions for Provincial Highways No. 21 and 20 were issued. Bridge construction on Provincial Highway No. 21 (Minsheng, Gongyuan, Minzu and Minquan bridges) is scheduled for completion by December 31, 2012. Twelve contracts for roadbed repairs on Provincial Highway No. 20, Fuxing to Yakou 103K+000~149K+795, are expected to be finished by May 30, 2012, (besides 147K+520~149K+795, which is scheduled for completion by September 30, 2012). Through the end of November 2011, spending to repair roadbeds and bridges ravaged by Typhoon Morakot was NT\$4 billion.

Repairs are complete on 10 bridges, including Nanzihsian River, Side, Liouguei, Liouguei No. 3, Liouguei No. 4, Sinfa, Dajin, Jiasian, Sinciwei, and Ciwei.

There are also more projects to commission, routes to select and repairs to be made on Provincial Highway No. 20, 95K~103K (Taoyuan to Fuxing) and Provincial Highway No. 21, 213K~220K (Hsiaolin to Namasia). For these projects, the DGH submitted a report to the MOTC on December 22, 2011. Before long-term rebuilding is complete, temporary steel bridges that are highly resistant to disaster will be used.

The devastation wrought by Typhoon Morakot to Taiwan's highways cannot be undone in one step. Staff in the DGH's Third Maintenance Office worked constantly while adhering to their plan for progressive repairs. Their goal was to meet the transportation needs of the residents.







Urgent Reconstruction of 47 Aged and Damaged Provincial Highway Bridges

Taiwan is divided by the Central Mountain Range. Many of its rivers run east to west or vice versa, so transportation between north and south relies on a series of bridges. These bridges are an important part of the infrastructure that connects regions and spurs economic development.

As the environment changes, the bridges built years ago are gradually becoming aged. Also recent extraction of gravel from rivers has caused riverbeds to fall, leaving the foundation of many bridges exposed. Adding to the problematic situation are frequent extreme weather events. Early bridge design standards are not suitable for today's environment. Many older bridges cannot withstand the impact of current disasters.

Inspections Reveal 47 Provincial Highway Bridges in Urgent Need of Rebuilding

The DGH must provide safe roads. To do so, it considered records of bridge inspections, disaster damage, and river management plans, to assess the ability of bridges to withstand earthquakes and floods, along with their load capacity. It then gave the Executive Yuan the Refurbishment Project of Aged Bridges on Provincial Highways in February 2007. It was approved in November 2007, and the first stage of bridge reconstruction was set to last for six years, from 2008 to 2013. Forty bridges would be repaired at a cost of NT\$11.79 billion.

But plans were not finished. When extreme weather events unleash their fury, the nature presents a significant challenge to manmade structures. It is a major test that bridges must face. An example came in September 2008, when the slow-moving Typhoon Sinlaku caused the Houfeng Bridge incident. The DGH then inspected more than 2,700 highway bridges it is responsible for, filtering out those at the greatest risk. These were added to the Refurbishment Project of Aged Bridges on Provincial Highways, causing the DGH to release its Urgent Reconstruction Project of Aged and Damaged Bridges on Provincial Highways. The project called for work on 47 bridges.

Safe Travels and Shorter Construction Time

When evaluating which bridges needed urgent rebuilding, it identified 11 where work would be particularly difficult due to environmental elements and worksite conditions. It scheduled work







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to finish at the end of 2011 (or three years). The Executive Yuan approved the plan in December 2008, but requested that the DGH shorten the timetable to just two years, meaning the rebuilding of the 47 bridges should be finished at the end of 2010. The budget was set for NT\$20.417 billion. Improvements were to be made on a tight schedule to improve road safety.

Rebuilding 47 bridges in two years time was an extremely difficult task. It was not made easier by two flood seasons taking place during that time, and the plum rains and typhoons that strike Taiwan every May to November. In fact, it seemed like a "mission impossible." Typhoons that dumped extremely heavy rain on Taiwan included Typhoon Morakot in 2009 along with Typhoons Fanapi and Megi in 2010. Landslides severely damaged worksites. While rivers overflowed during flood season, the DGH construction team had to worry about the safety, quality and the schedule. Handling the pressure was no simple task.

Surprise as Goals Reached Ahead of Schedule

Whenever typhoons bring extremely heavy rain, temporary roads and worksites can be severely damaged. A cycle of building and rebuilding can emerge. Sometimes, work even must return to square one, but setbacks like these did not discourage the DGH.

Although the DGH was not able to rebuild all the bridges in the shorter allotted time, it still completed 43 before the end of 2010. Others were finished soon after, including the Xinpi Bridge on January 18, 2011, the Guohsing Bridge on February 11, 2011, the Jhuhu Bridge on February 28, 2011, and finally the Ligang Bridge, which reopened to traffic on March 6, 2011. If one were to ask Taiwan's civil engineers for their assessment of the project's execution speed, the DGH believes they would say it had far exceeded expectations.

Opening to Traffic Early Despite Strict Quality Requirements

While working on the project, the DGH's construction team did not fear typhoons or extremely heavy rain. While adhering to safety principles it worked quickly. It even exceeded standards despite strict quality demands. Construction was finished and the bridges opened to traffic on time, with expectations met.

The Refurbishment Project of Aged Bridges on Provincial Highways was transformed into the Urgent Reconstruction Project of Aged and Damaged Bridges on Provincial Highways. Work had been scheduled to finish and the bridges were to open to traffic by 2013, but instead these goals were reached in March 2011. Results show that the DGH and the government are growing.

Houfeng Bridge Achieves Pile Boring Techniques Record

In 2008 Typhoon Sinlaku caused the riverbed surrounding Houfeng Bridge to sink. The foundation was exposed on the Provincial Highway No. 13 bridge, leading to its collapse. Casualties occurred and traffic was disrupted, raising costs for people who had to take a detour.

With a heavy heart, the DGH issued a contract to rebuild the bridge in October 2008. Work began, and by the end of June 2009 the 15.5-meter-wide upstream side of the bridge was completed and opened to traffic. People could safely cross the river without having to instead rely on the temporary bridge on the riverbed.



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Conquering Adversity to Set a Record for Pile Boring

The Second Maintenance Office worked in relay format to get the job done. But geology was not in its favor. The office contended with gravel formations unique to central Taiwan. In order to prevent the foundation from being washed away, the first step of all-casing pile was sent to a national record depth of 50 meters. Therefore, boring or removing the piles was highly difficult because much of the layers were either hard cobblestone or densely packed aggregate and mineral fillers. The team had to research methods as it worked. Finally the pile boring was achieved, eliminating a potential obstacle.

Adjustments Made in Completing Pier Foundation

After the piles were solved, the baton was passed to excavating and building a foundation for the piers followed by raising the pier columns.

On April 20, 2009, extremely heavy rain struck central Taiwan, causing flooding to cover the foundation piles and equipment. When the floodwaters had not receded after three days, the Houfeng team explored upstream along the Dajia River. It discovered that the Dajia River Power Plant was



conducting a scheduled release of water from the Ma'an Dam. On behalf of the DGH, the MOTC negotiated with the Ministry of Economic Affairs for the water release to stop for seven to 10 days. Receding water allowed the pier columns to appear at the beginning of May. At the end of May cap beam placement was completed. The baton passed to steel girder hoisting.



Steel Girder Hoisting Becomes a Race against Time

Steel girder hoisting began as each pier foundation cap beam was finished. The first girder was hoisted successfully on May 17. When the final girder spanning directly over the water was hoisted on June 4, the river level suddenly increased, rising from 15 cm to 400 cm within just half an hour. Workers gathered hoisting equipment at the span and a scramble began to stabilize the girder. Stabilization was finished in 30 minutes, but by then the water had damaged the temporary road and flooded the work zone.

The next day, the river had begun to recede. Workers were celebrating that the equipment was not damaged when they received bad news - the Central Weather Bureau forecast another frontal system arriving on June 10. The team decided it would finish the last five girders by June 9. With the chairperson of the construction company supervising, efficiency increased dramatically. The temporary road was repaired in just half a day, a job that normally takes three to five days. Then, just before the frontal system arrived, the girders were in place on the 15.5-meter upstream side of the bridge. The baton was passed to bridge deck reinforcement, the last stage of work.

Working Through the Night to Finish Bridge Deck Placement

The bridge deck reinforcement team began work from both the north and south ends of the bridge. It received bad news, however, when a typhoon warning was issued for Hualien on June 19. Chen Ching-fa, the director of the Second Maintenance Office, invited the president of the construction company to the worksite so they could research response strategies. They decided to erect lighting at the scene so work could continue through the night. Senior management from ownership, supervision and construction accompanied more than 50 workers. By the next morning they had finished bridge deck placement (afterward, the typhoon never came to Hualien).

Through perseverance, by the end of June 2009 the construction team first provided two lanes heading both north and south on the upstream side of the river. By June 29, 2010, the entire bridge was finished and opened to traffic.

MOTC Gives a Well-Deserved Golden Way Award

Construction was difficult, but through it all, each team member remained committed to giving road users a safe way home.

The reopening of Houfeng Bridge made transportation more convenient for Houli and Fengyuan residents. It also made the commute easier for workers in the Central Taiwan Science Park. Drivers heading to National Freeway No. 4 no longer had to contend with regular traffic jams. The project led the MOTC to give a second place Golden Way Award for Construction Excellence. People were also moved by the harmonious cooperation and supervision provided by the agencies in charge of the project and companies responsible for the work.

Perfection in Construction

Strengthen Flood Resistance on Guohsing Bridge

The Guohsing Bridge is located over the Tsengwen River on Provincial Highway No. 17. In 2011 at the 11th Public Works Gold Quality Awards, hosted by the Public Construction Commission, its refurbishment was one of 39 projects to have the honor of being nominated for a prize.

Among the 47 bridges that were included in the Reconstruction Project of Aged and Damaged Bridges on Provincial Highways, Guohsing was the only bridge to be recommended for a Gold Quality Award and won. Also in the civil engineering category, it was the only central government project to win an award where in-house supervision was adopted. The success affirmed the hard work of the DGH's West Coast Expressway Southern Region Temporary Engineering Office.



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Rebirths Lead to "Bridge 3G"

Guohsing Bridge crosses the Tsengwen River about 8 km from its mouth. It connects Tainan's Chigu and Annan districts. The original bridge was completed in 1979, and as the economy grew, so did the bridge. Its two sides were widened in 1992. Unfortunately, in September 2007 Typhoon Sinlaku caused Pier 26 to subside, creating safety concerns.

These worries led to refurbishment aimed at creating a third-generation bridge. Piers 18-33 were included in the new generation, a 450-meter-long bridge with a net width of 30 m. It is a three-element (with seven spans) steel box girder RC bridge. The longest span is 120 m, and steel girder hoisting occurred onsite. It came at a cost of NT\$1.2 billion.

Record Foundation Excavation Passed Earthquake Tests

Construction features to consider included keeping the road open and maintaining a tight schedule. Engineers worked to reduce pier sinking in deep pool areas and increase span length in areas directly over the water to lower costs. Also to adhere to the regulations and fulfill the construction needs, the foundation top in river areas must fall below the riverbed. Excavation therefore went approximately 22 m deep, which was a record for Taiwan for a river bridge. Highly stiff, removable steel pipe piling was used during excavation to brace the soil, and safety was monitored closely. Work was underway during the March 4 Jiasian earthquake and the March 8 Chiayi earthquake. No problems occurred, demonstrating that safety measures were sufficient.

Special Measures to Suit the Construction Site

Guohsing Bridge lies close to the river mouth. To prevent corrosion, careful attention was paid to the structural characteristics of the steel components. For the design of the wind-facing side of the bridge, external web plates covered lower flange plates and weather-resistant bolts

were used. Also, designers used sulfate-resistant concrete, and they increased the thickness of the concrete protective layer on the bridge deck, protective rails, piers, foundation, and foundation piles.

Recyclable steel that could extend the life of the bridge was adopted for the upper frame, and a parabolic shape was used to lower steel weight and reduce pier column dimensions over the water. Designers paid close attention to economics, mechanics and aesthetics. They also used a gray color scheme in line with other prestressed bridges on the same stretch of road that had not been rebuilt. The constant theme brought visual harmony.

Construction also took into account the tides. The original bridge's foundation was reused to build a temporary bridge for construction. This could avoid pier columns of the temporary bridge impeding water flow, thus lowering construction risks and reducing costs.

Mental Exertion to Overcome Building Challenges

Work on Guohsing Bridge proceeded in halves to ensure that transportation was not hindered. It began with building a new downstream half of the bridge while the old, upstream half remained open. When the downstream portion of the new bridge was finished, the rest of the old bridge was torn down so work could proceed on the new upstream half.

Natural disasters that occurred during construction included Typhoon Morakot and the Jiasian earthquake. Also, because the bridge is close to the mouth of the river, workers had to contend with tides and strong winds. Because it was Taiwan's deepest bridge in a deep pool area, 37-meter-long steel pipe piling was used to construct a cofferdam. Regulations also prohibit the use of large cranes on temporary bridges that are 10-meters wide or less. Girder hoisting then became a difficult task that tested the knowledge and perseverance of workers.

Success Leads to a Safe Bridge Home

The first stage of the construction project was completed and opened to traffic on July 17, 2010, and the second stage was finished and opened to traffic on February 11, 2011.

When it reopened, the Guohsing Bridge was more resistant to floods. It reduced safety concerns associated with long-term exposure to flooding and typhoons. Also, it was finished 83 days early, saving NT\$34.86 million in costs (with each day saved NT\$420,000). But most importantly, the Guohsing Bridge became the safest bridge home for many people.

Construction Safety on the East-West Expressway Beimen/Yujin Line is Affirmed

The Council of Labor Affairs began holding the Public Construction Safety Gold Awards in 2007 to promote a safer and healthier work culture. In 2009, it changed these awards to the Outstanding Public Works and Personnel for Promoting Occupational Safety and Health. The purpose of the awards was to inspire better safety management of infrastructure projects to improve the work safety culture. Complete standards were needed for building procedures to prevent workplace disasters.

Each year the DGH wins an award or is nominated for one of its projects. One office that is particularly important to oversee the creation of a safe working environment is the Kao-Nan Region Construction Office for the East-West Expressway, which saw its responsibilities increase significantly when it was merged with the Southern Region Construction Office for the East-West Expressway. The Kao-Nan Region Construction Office was managing 11 construction projects with budgets totaling more than NT\$20 billion. To ensure safety, it used the experiences that led to a first place at the 2nd Safety Gold Awards and applied them to its new team. The result led to another award at the 2011 Outstanding Public Works and Personnel for Promoting Occupational Safety and Health.

Outstanding Performance by Lead Agencies, Supervising Units and Contractors

Selection committee members gave the following insight to participants on the East-West Expressway Beimen/Yujin Line Tender E707-3:

1. Risk Management of Construction Safety Issues by Lead Agencies: The lead agencies were responsible for following regulations to set safety guidelines and standards, apportion the budget, create the work safety plan, and oversee execution. At designing phase they considered the river and road environment when deciding to use large span techniques to reduce pier sinking and lower traffic maintenance risks. They also were responsible for inspections and calculations related to the pier column reinforcement sample frames. During construction the lead agencies worked with the supervising units to develop an innovative advance evaluation mechanism for class D risk assessment reports, which led to approval following just one examination. Each of these achievements was praised by the





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Perfection in Construction

committee. The committee recommended that the rate of workplace inspections and supervisions (a total of three such visits monthly by the Construction Branch and the Maintenance Office) be increased. It also said the inspection (or re-inspection) forms used by the supervising units should be different.

- 2. Safety supervision Techniques from Supervising Units: The supervising units were responsible for teaching and training topics related to creating a safe and healthy workplace. They established a 17-item SOP for health and a standard recognition system for work safety. Also they developed a work inspection plan for high-risk procedures. When work safety incidents occurred, the units conducted reviews to determine the cause. They also provided lessons on disaster prevention and emergency response, along with instruction on reporting procedures and filling out report forms. And they implemented the Items to Consider for Construction Work Safety that were formulated by the MOTC.
- 3. Safety and Health Mechanisms, Plans and Implementation by Contractors: Contractors provided complete safety and health records. They also formulated safety procedures suited to the environment when preparing the riverside foundation and testing soil load capacity. Progress was needed, however, in entrance control, reviewing faults, retraining and revisions, and the inspection of dangerous machinery and facilities (including bucket trucks).

Continue Working toward Zero Workplace Safety Hazards

During the selection process, the DGH reminded the Council of Labor Affairs and committee members that not only large firms can specialize in providing a safe and healthy operating environment with a focus on risk management. By recommending small and medium firms as candidates, the DGH could encourage extensive improvements and investment in workplace safety management.

Winning the award meant not only affirmation for the construction team but also more responsibility. The DGH has provided numerous instruction and training to supervisors. It develops partnerships so disaster prevention resources can be combined and different units can cooperate to uncover, differentiate and solve workplace risks. Through instruction and training, it can provide guidance toward preventing workplace disasters. Together, these efforts help the DGH strive toward attaining 100% work safety, zero workplace safety hazards.



New Construction on Expressway No. 65 from Chenglin Bridge to Tucheng Interchange

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The Expressway No. 65 construction project (formerly Taipei County Special Highway No. 2 project) was launched because New Taipei City (formerly Taipei County) did not have a north-south expressway on its west side. The project was needed to mitigate obstructions caused by limited bridge crossings over the Dahan River and to assist in urban development in Xinzhuang and Banqiao. It was to play a major role in solidifying the expressway network in the metropolitan Taipei area.

The DGH Continued with 2nd and 3rd Stage Construction

The Taipei County government started promoting the Expressway No. 65 construction project in 2000. It was separated into three stages. In 2001 funding for the first stage (covering the Provincial Highway No. 1 section and the metro's Tucheng Depot section) was approved as part of the Program for Economic Revitalization through Expanded Investment in Public Construction. It was to be carried out over separate years. In 2002 the entire construction project was included under the "Challenge 2008, Six-Year National Development Plan". Its feasibility report was approved by the Council for Economic Planning and Development in July 2002. The Taipei County government therefore decided to rely on these decisions for comprehensive planning and to submit its report to the Executive Yuan for approval. The MOTC agreed in principle in November 2002 to include the project in the provincial highway system. In August 2003 the Executive Yuan passed the comprehensive planning report, and the second and third stage follow-up construction was handed over to the DGH.

The Taipei County government submitted a revised plan for land acquisition to the Executive Yuan on April 16, 2004. The DGH then gave its revised report to the Council for Economic Planning and Development on November 9, 2004. The Executive Yuan later included the project as part of its Economic Revitalization Policy - Project to Expand Investment in Public Works, under its i-Taiwan 12 Projects policy.



A New Page for New Taipei's External Transportation Links

The Expressway No. 65 project began in the north at the Wugu Interchange. It passed south through Xinwu Road over Xinzhuang's Zhongshan Road, Xintai Road and Zhongzheng Road, before crossing over the Dahan River near the Taliaokeng Pumping Station. From there it reached Banqiao District and followed along the west bank of the Nanzai Ditch to Tucheng's Huanhe Road, before crossing over the Chenglin Bridge. It then followed Daan Road to Zhongyang Road. The total distance was 12.41 km, and it reached 12.8 km when combined with the Tucheng Interchange Improvement Project. The project passed through five administrative districts, including Wugu, Taishan, Xinzhuang, Banqiao and Tucheng. It connected directly to National Freeways No. 1 and 3.

There were seven tenders on the Expressway No. 65 project, including Tender 4-3, from Chenglin Bridge to Tucheng Interchange. The main elevated bridge on the 1,590-meter segment used steel pillar columns and a steel box girder design. The outer ramp used RC pier columns and prestressed concrete in an I-beam design. Ramps (I, J, K) connected to Chenglin Bridge, and the foundation used 394 all casing piles with a diameter of 1.5 m and lengths of 18-36 m. Also on ground level roads such as Huanhe and Daan, accompanying works were completed, including drainage and lighting. Tender 4-2, to connect to Special Highway No. 2 in the north, followed along the right embankment of Huanhe Road and the Dahan River. After crossing the Chenglin Bridge it followed Daan Road to Tucheng's Zhongyang Road.

The purpose of the construction project was to provide a north-south expressway for the west side of New Taipei, completing the expressway network of metropolitan Taipei. It connected to National Freeways No. 1 and 3 via the Wugu Interchange and the Tucheng Interchange. To the north it connected with the Expressway No. 64 Bali-Wugu section, linking Taipei' s international commercial port, Taipei Harbor, with National Freeways No. 1 and 3.

Winner in the National Golden Award for Architecture

Tender 4-3 on Expressway No. 65 finished ahead of schedule on July 28, 2011. It opened to traffic on October 22. Progress, quality and work safety were all excellent, verified by inspections conducted during construction. The contractor used its work to enter the 13th National Golden Award for Architecture which was held by the ROC National Enterprise Competitiveness Development Association. On October 12, 2011, it became the sole infrastructure project to win the first prize in the civil engineering category.

The completion of Tender 4-3 on Expressway No. 65 and the subsequent opening to traffic can lower travel time and costs. It can also ease the congestion on the west side of the Zhonghe Interchange which heads north to the Greater Taipei area, and reduce average travel time from Wugu to Tucheng interchange. The improved efficiency will lead to economic benefits.

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Meticulous Motor Vehicle Services Leave Customers Satisfied \bigcirc

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Achievements in Highway Public Transporation Planning

In 2009, the MOTC proposed the "Highway Public Transportation Development Project (2010-2012)." Its purpose was to achieve robust public transportation development. The project was most suited to using local development models to build a sustainable urban public transportation environment.

After two years of implementation, the project changed the public transportation environment. In December 2011, the MOTC instructed the Office of Science and Technology Advisors and the Highway Public Transportation Development Office to hold a highway public transportation conference. Local transportation office chiefs and directors along with scholars and experts joined. The conference was jointly hosted by the MOTC minister and deputy ministers, the chief of the Department of Railways and Highways, the DGH director general, and the heads of the Institute of Transportation.

Offering Complete Service in a Robust Transit Environment

The main goals of the project were to provide excellent public transportation, attract new and habitual users, create a robust public transportation environment, and guarantee basic transportation rights in remote areas. The following items were included:

Provide Excellent Public Transportation: Promoted model projects, examined regulatory mechanisms, improved the transportation environment in eastern Taiwan.

Attract New and Habitual Users: Offered consumer incentives to raise demand, implemented an inspection mechanism, established survey and analysis mechanisms for public transportation usage.

Create a Robust Public Transportation Operational Environment: Improved vehicles, roads, station equipment, service effectiveness and inspection mechanisms, also promoted negotiations among different public transportation providers for transfers.

Guarantee Basic Transportation Rights in Remote Areas: Ensure the basic transportation rights of people on outlying islands, in remote areas and along service routes.

Striving for a Comprehensive National Subsidy Project

2011 subsidy projects and results:



 Subsidies for Losses from Operations in Remote Areas or on Service Routes: The purpose was to guarantee basic transportation rights so people in remote areas and on outlying islands could enjoy transportation benefits.

- (1) Subsidies for losses from operations in remote areas and on service routes in 2010 and 2011 amounted to NT\$2.271064 billion.
- (2) Suspended operations in remote areas and on service routes were decreased.
- (3) Improved subsidy mechanisms to increase the effectiveness of subsidies.
- 2. Replacing Old Vehicles:

Provided disability-friendly buses with low floors and other amenities:

- (1) The average age of vehicles was decreasing rapidly, providing a more comfortable and safer riding experience. After new buses were added in 2011, the average vehicle age fell to 7.75 years, a drop of 28.37%.
- (2) Precedence was given to replacing mid-sized buses on remote routes to reduce fuel and
- maintenance costs. A total of 254 vehicles were replaced.
- (3) Replacing old vehicles changed negative impressions.
- 3. Subsidies Provided to Buy 132 Vehicles for New Bus Routes:
 - (1) Opening High-Capacity Bus Routes in Urban Areas

Expanded the service network and developed capacity along the future metro bus routes to increase overall capacity.



2010, 2011 Subsidies for Losses on Highway and City Bus Routes

Year	Subsidized Routes	Approved Subsidy Amount (NT\$)
2010	1,013	1,140,464,136
2011	1,030	1,130,600,000

2011 Subsidies for Replacing Old Vehicles

	Low Floor	All-New/ General	Mid-Sized Bus	Subtotal
Highway Buses	34	116	74	224
City Buses	94	113	59	266
Total	128	229	133	490

2011 Subsidies for Vehicles on New Routes

Low Floor	All-New/ General	Mid-Sized Bus	9-Seater Bus	Subtotal
76	5	41	10	132



(2) Expanding Basic Services

Made riding more convenient by increasing accessibility of the remote bus routes.

(3) Developing Tourist Shuttle Buses

Used incentives and promotions to encourage people to switch from driving private vehicles. This reduced traffic at tourist sites and during activities.

- 4. Bus Waiting Facilities (Bus Kiosks, Signs and Transfer Facilities): Waiting facilities were established based on local features. There were 1,294 signs, 313 kiosks, and two transfer stations added.
- 5. Highway and Intra-City Bus Performance Assessment: Performance Assessments were conducted on station services, bus safety, service quality management, and business operations.
- 6. Establishing a Real-Time Bus Information System for Intercity Bus: To improve management, the central system was established in 2011 and the first stage of the information system website was completed.

On-board units were installed in another 1,000 intercity buses. Service announcements were issued in December for the installation of 5,500 units. These are expected to be installed in 2012.

- 7. Subsidies for All-in-One Electronic Ticket Readers: Bus operators applied for subsidies to install an all-in-one electronic ticketing system. It contributed to the goal of building a seamless transfer environment.
- 8. 2011 Bus Tour around Taiwan: An activity to let people know the government's commitment to promoting public transportation.

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Trial Road Test for New Drivers

In recent years many new drivers have complained about road anxiety after getting their license. To change this situation, the DGH director general advocated a new driver's test with a road component.

Planning the New Driver's Test

A majority of the countries in the world conduct driver's tests on public roads. Taiwan holds them in enclosed spaces, which has proved to be an obstacle when it tries to negotiate for mutual license recognition agreements. To improve the testing system, enhance driving techniques and etiquette, meet public expectations, and make it easier for Taiwanese to drive abroad, the DGH developed a trial plan for public road test for new drivers. To make the plan feasible, the DGH had to take many strategies into account, including fairness, public safety, and liability for potential accidents

There are many elements that determine whether a person is a qualified driver - she must respect safety regulations, have good driving etiquette, and reduce risks to a minimum. To cover each of these areas, plans for the trial exam were separated into driving technique and etiquette. Many steps were taken to prepare, including: adding incentives to get new drivers to join the trial, training and reviewing testing staff in areas such as ethics, creating test pamphlets, determining test scoring items and standards, adding cameras to testing vehicles, choosing testing routes and obtaining rights to use these routes, increasing insurance and



payouts for potential claims, determining responsibility under civil code and criminal code for potential accidents, and assigning staff. The trial project was approved by the MOTC on August 11, 2011. \bigcirc

Trial Road Test for New Drivers Launched in Stages

The trial road test for new drivers was divided into three stages.

The Training Institute was responsible for the first stage. It recruited new drivers who had recently obtained their license to take the trial test, which had no

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bearing on their license status. Six months after the implementation, the Penghu Motor Vehicle Station joined the Training Institute in recruiting volunteers for its own trial test. Also, a research team was added to the project. It examined driving tests used in other countries and offered suggestions on the testing items, scoring, training and assessment of test administrators, differences between various cities and counties, testing SOP, and evaluations.

For the second stage, a trial test was used that combined enclosed space and public road elements. It was also first conducted by the Training Institute. Besides holding additional trials at the Penghu Motor Vehicle Station, motor vehicle offices with simple traffic conditions

were added. During the second half of the year, more samples were gathered by giving the test to new drivers in at least one highscoring driving school from northern, central and southern Taiwan.

If results from the first two stages are good, the DGH hopes to use additional driving schools in its third stage of the trial. It could then fully implement the policy in the fourth year if the plan is shown to be effective and feasible.

Trial Road Tests to Improve Traffic Safety

Predicted Impact:

- 1. Establish road test standards and procedures to use as a reference for future implementation
- 2. Encourage new drivers to practice proper driving techniques early, recognize safe driving etiquette, and develop basic responding techniques to improve traffic safety
- 3. Increase the rate of new drivers in driving schools who take the road test. The classes will have to add a road component to the curriculum, so students feel more comfortable and confident about driving.
- 4. Help Taiwan sign mutual license recognition agreements with non-allies. This will make it more convenient for people to drive abroad.



Motor Vehicle Services Returned to Central Government



When MOTC Minister Mao Chi-kuo took office, one of his first steps was to instruct the DGH to bring greater uniformity to motor vehicle services. During the special municipality upgrades of May 2009, the DGH commissioned Professor Jason Chang of National Taiwan University to research on the central government's role in motor vehicle services. The report listed four advantages of assigning supervision duties to the central government. It was given to the MOTC and then passed on to Premier Sean Chen, who approved it on January 1, 2012.

Centralizing Motor Vehicle Services Brings Uniformity

The DGH originally established five motor vehicle offices in Taipei, Hsinchu, Taichung, Chiayi and Kaohsiung, along with 22 motor vehicle stations. In 2012 after the Taipei City and Kaohsiung City motor vehicle offices were added, the total was increased to seven offices and 26 stations. New stations were established at Shilin (originally the northern branch of the Taipei office), Lingya (originally the southern branch of the Kaohsiung office), Kinmen, and Lienchiang.

Centralizing motor vehicle services brings greater uniformity to enforcement. Advantages include a wider range of services and sharing of resources when implementing government policy. For example, multiple observations at the Taipei City, Kaohsiung City, Kinmen and Lienchiang units revealed 72 discrepancies related to vehicle management, driver management, driving infractions, taxes, and the transit industry. Four meetings were then held on rectifying these discrepancies.



Integrating Motor Vehicle Services

The Highway Act assigns motor vehicle services to the central government. In the past, because central government agencies that oversaw highways had not established motor vehicle units, responsibility shifted to the Taiwan and Fujian provincial governments and the Taipei and Kaohsiung governments. In July 1999, following the downsizing of the provincial government, authority over the Taiwan Provincial Highway Bureau was handed over to the Ministry of



Transportation and Communications, and the bureau's name was changed to the Directorate General of Highways. Motor vehicle services were divided between the central and local governments. Then, after the special municipality upgrades, the Executive Yuan approved the Taipei City and Kaohsiung City motor vehicle offices. These new offices brought more uniformity to motor vehicles services and ensured they would originate with the central government.

The Taipei City and Kaohsiung City offices and the Kinmen and Lienchiang stations formally opened on January 1, 2012, under the authority of the DGH. The DGH director general and its three deputy director generals hosted the ceremony. Also the MOTC's deputy ministers, chief secretary, and bureau chiefs were invited to visit the Taipei City and Kaohsiung City offices and the Kinmen and Lienchiang stations to oversee successful integration.

Launch of Online License Plate Selection Service

The DGH's Taipei Motor Vehicle Office developed a plan to offer online license plate selection services for small, personal use vehicles. The plan allows people to choose their own plate and simplifies the procedures for issuing plates. It brings more fairness, impartiality, openness and transparency to the process. People can go online to check the plate availability or to choose a plate and make a payment. The service fulfills Taiwan's e-government strategy by allowing drivers to access more services online.

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Online Plate Selection, Anytime of the Day

The online system for choosing a license plate number is open 24 hours a day. Users need to have a valid citizen digital certificate from their household registration office, a smart card reader, and a bank (or post office) card or credit card from designated financial institutions. They can use the system after registering for the Electronic Motor Vehicle and Driver Information System. Those who have not registered for a citizen digital certificate can still use the system by requesting assistance from a person with a card. Users need to follow the online directions for choosing a plate number. After payment they should print their receipt and take it with their ID to a service counter for issuing new license plates by 5 p.m. on the next working day.

Planning was launched in March 2010. The hardware bidding process began in June, and the internal testing started in October. During this process, the Taipei Motor Vehicle Office worked with Chunghwa Telecom's HiNet unit along with post offices and other financial institutions to build the service and test payment transfers.

Effective Results Show Service Can Be Launched Nationally

Challenges were overcome during testing and a trial was launched in February 2011. Formal implementation took place in the following month. Advantages of the new service include:

- 1. Planning Innovative Functions:
 - (1) Anyone who has a citizen digital certificate and joins the Electronic Motor Vehicle and Driver Information System can go online anytime to check plate availability or to choose and make payment on a plate.
 - (2) Vacated plate are automatically replaced, so whenever a plate is issued or chosen, the system automatically replaces it with another. There are always 2,000 plates available for vehicle owners to choose from.
 - (3) The system is available on the Electronic Motor Vehicle and Driver Information System, and it is linked to the second-generation Motor Vehicle and Driver Information System (MVDIS-II). In the future it could be used at other motor vehicle units in Taiwan.
 - (4) When choosing a plate, required information includes the name of the vehicle owner, ID number and the vehicle identification number. The system connects to the national

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motor vehicle center database for cross-check, then allows users to choose a plate. Once a plate is picked, the information is sent to the MVDIS-II.

- 2. Streamlining Operations and Raising Efficiency:
 - (1) People can choose a license plate online at anytime by using the plate management option on the Electronic Motor Vehicle and Driver Information System. There is no need to wait in line, and the simplified process reduces labor work and streamlines operations.
 - (2) Motor vehicle units do not need to accept large cash payments or issue receipts. They can save time by eliminating steps in the payment process, and they can better manage accounts.
 - (3) The process makes choosing and approval of a license plate more transparent, reducing doubts some people may harbor. The fairness, impartiality, openness and transparency improve the image of public agencies.
 - (4) The Electronic Motor Vehicle and Driver Information System and the MVDIS-II are linked. This step reduces errors by ensuring correspondence of basic owner and vehicle information along with the online plate choice.

Innovative Achievements Lead to Management Awards

In 2011, from the system's launch in March to the end of December, there were 10,752 successful license plate number selection cases. That represented an increase of 20% compared to the 8,968 times during the same period in the previous year, leading to an additional revenue of NT\$3.568 million. The MOTC honored the achievement in 2011 with a first class award in innovative management.

Sun Moon Lake-Alishan Bus Route Opens

In the report of the MOTC departmental meeting on December 1, 2011, it was said that "Investigation into the Sun Moon Lake - Alishan route operated by the Yuanlin Bus Company showed development potentiality. It made clear that the operation model for the public transportation at Sun Moon Lake can be replicated."

October 10, 2011, was an important day for the development of the public transportation in Taiwan. At the square in front of the Sinyi Township Farmers' Association in Nantou County, a ceremony was held to mark the inaugural run of the Sun Moon Lake -Alishan bus route. The bus route is part of the MOTC's project to promote a seamless public transportation system. Chen Tsung-chien, the director of the Taichung Motor Vehicle Office, and Yuanlin President Yang Siao-yi hosted the event, which was attended by representatives and officials from the central and local governments



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along with other special guests. All of them gathered at the square, including passengers who witnessed a special moment in Taiwan's public transportation history.

Linking "Pearls" Through the Highway Bus System

The 921 earthquake of 1999 interrupted the bus route from Sun Moon Lake to Alishan that had been available for a dozen years. It had been a vital part of connecting the beautiful tourism segment of Sun Moon Lake, Dongpu, Yushan National Park, and Alishan Scenic Area. MOTC Minister Mao Chi-kuo has said: "the highway bus system should connect Taiwan's every pearl." His comment provided much of the inspiration behind a plan to combine the DGH's highway public transportation development project with a Tourism Bureau project to ensure seamless access to tourist sites. A landmark moment came on the ROC centenary when the inaugural bus run for the Sun Moon Lake to Alishan route took place.



Inaugural Run Brimming with Honor and Emotion

At 9:50 on the morning of the ROC centenary, the first Yuanlin bus reached the Sinyi Township Farmers' Association after leaving Sun Moon Lake. It was met with applauses. Director Chen, Yuanlin President Yang and other guests cheered and set off firecrackers to get the ceremony underway. Passengers who had been waiting at the side got onto the bus, unable to suppress the excitement of being part of the inaugural run.

Combined Transit Routes Provide Seamless Access to Tourist Sites

Operating the new bus route gave tourists a chance to enjoy the convenience of the public transportation, and the Yuanlin Bus Company chose to use mid-sized buses to improve safety on the mountain roads. In the beginning buses departed from Sun Moon Lake at 7 a.m. and 9 a.m. to head to Alishan. The 102.5-kilometer route took about three hours and cost NT\$307. Buses head to Sun Moon Lake departed from Alishan at 1 p.m. and 2 p.m.

Tourists can combine the Sun Moon Lake - Alishan route with other bus routes connecting nearby tourist sites, including Taichung - Sun Moon Lake or Alishan - Chiayi. Service to Dongpu is also available when using these routes. By combining various public transportation options, tourists have a convenient way to reach the next spot on their itinerary. The sites come together in a web that provides new opportunities for development of the tourism industry.

Public Transportation Makes It Easier to Cherish the Land

The government has launched many projects to encourage people to use mass transit for low-carbon journeys. These include the Taiwan Tourist Shuttle, the Seamless Public Transportation Project, Shuttle Bus Subsidies for Local Governments, and the 2011 Bus Tour around Taiwan. Each of these projects contributes to building a good tourism environment and improves highway transit quality. They let tourists from Taiwan or abroad travel at ease, letting them gain a deep understanding of this land and its unique charm.
Joint Inspection Units Shoulder a Heavy Burden

One of the DGH's missions is to oversee motor vehicles and drivers to ensure safe travels on the country's roads. Safety of the large passenger vehicles has an especially large effect on people's lives and property. The DGH takes many steps to reduce incidents associated with commercial passenger vehicles to a minimum. Besides requiring regular inspections, on weekdays and holidays it sends officials to major roads, freeway toll stations, and scenic areas. These orange-clad motor vehicle inspection units join officers to wave vehicles over for inspections. They work in winter or summer, and fear no cold nor the rain. Because of workers like them, for years we have been able to say proudly: "We accomplished our goals."



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Vehicle maintenance involves much more than just slogans. Division of duties and cooperation are required while staff must fulfill their responsibilities to ensure the safety of road users.

Before inspections are conducted, the staff gathered. They check the equipment and review the procedures, repeatedly practicing what they need to say when waving over a vehicle. Then when actual inspections take place, drivers and passengers clearly understand the purpose.

Inspection items take into account the safety of the vehicle and the driver's credentials. The location and use of the safety equipment are described to passengers, and drivers are asked questions such as techniques for navigating sharp descents. Finally, inspectors wish everyone a happy journey. As the vehicle drives away, passengers who press against the window and wave or give a thumb up let inspectors know they value the effort they put into to keep everyone safe.

A Commitment to Happy Travels and a Safe Journey Home

Performance by the joint inspection unit from the Miaoli Station of the DGH's Hsinchu Motor





Vehicle Office has always been noteworthy. The hard work from the staff in this unit cannot be revealed simply through numbers on a report sheet. They have to overcome not only challenges posed by the climate but also unexpected circumstances and anger from drivers who are fined. Through it all, each staff member adheres to the core value of finding ways to reduce traffic incidents. They care about providing people with happy travels and a safe journey home more than anything else.

Providing Road Users a Safe Transportation Environment

When a photo of the staff at the Miaoli Motor Vehicle Station appeared on the awards screen at the 2011 Safety Gold Awards, it was clear that the MOTC was awarding all members of the DGH inspection staff. The significance behind the Safety Gold Awards is a recognition for providing a safe, worry-free transportation environment. It is a commitment that the DGH will continue to tirelessly maintain.

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Offer Caring Service to Disadvantaged Groups

On August 19, 2011, the DGH's Chiayi Motor Vehicle Station and Budai Township Household Registration Office hosted a special event at the Southwest Coast National Scenic Area. They borrowed the Budai Visitor Center to hold the cross-departmental New Immigrant and Senior Motorcycle License Exam Review Class.

Bravery in the Face of Repeated Failure

The setting was common for a driver's license review class hosted by a motor vehicle unit. For a senior seaman named Kao Fei-cheng, it was the site of a strange challenge.

Kao has no fear when facing the deep blue sea, but when signing up for the class, he said he began trying to get a drivers license at age 23. He took the exam more than 40 times, but with only an elementary school education to rely on, he could never pass it. While driving, whenever he saw the police in the distance he would become worried. Kao would have to get off his bike and walk past.



Hard Work Finally Yields Results

After more than half a month and 30 hours' review, Kao took the written exam and scored 70. He was still short of the 85 points that was needed to pass. The staff noticed his melancholy face, but Kao was not ready to give up, and the Chiayi Motor Vehicle Office still had faith in him. The following week the Deputy Chief Ke of the office called the Budai Township Household Registration Office. Ke wanted help in gathering people who had failed the written portion of the driver's test but still wanted to give the exam another try. They were invited to the office for tutoring. Kao, of course, was one of them.

After two rounds of tutoring, on September 2 Kao finally passed the written exam with a score of 87.5. He had no trouble passing the driving portion of the exam. When Kao went to pick up his license, the staff finally saw his bright smile. He told them that more than anything else, he wanted to ride his scooter and pass by a police officer without having to feel the need to hide.

Perhaps the day will come when Kao and the staff at the motor vehicle office forget each others' names and faces. But even the passing of time will not erase from Kao's memory the unusual exchanges he shared with the office staff. These will be brought to the surface every time he glimpses at his license.

E-survey to Measure Customer Satisfaction with Motor Vehicle Services

The DGH's Kaohsiung Motor Vehicle Office pondered over how to raise customer satisfaction by providing great service. Its goal was to gain the trust and support of the people it serves. The office decided that if it could immediately learn what made people upset, then it could solve these problems and perhaps even turn dissatisfaction into satisfaction.

The result led to the development of the customer satisfaction e-survey. Launching the

survey involved bringing new technology to the service desk, and focusing on respect for the customer. The office was able to give the DGH a new image by adhering to two goals: (1) Constant work toward providing satisfactory service, and (2) Never let customers leave the motor vehicle office upset.

Innovative Services That Meet Customer's Needs

The Kaohsiung Motor Vehicle Office added touchscreen monitors in front of its service counters. These provide an entirely new experience for the customers waiting to be served.

- While customers are waiting, videos about the motor vehicles services, vehicular maintenance, and road safety are also playing. These promotional videos prevent customers from becoming bored while waiting for their turn.
- 2. When a customer is being served, the screen posts information related to the service provided and the amount of money owed. Customers can check the information on the screen to reduce the chance of error. This helps guarantee rights and eliminates disputes.
- The screens issue a sound alert reminding people to complete a customer satisfaction survey. On the screen people can rate their experience by providing answers such as "very satisfied," "satisfied," "no opinion," "dissatisfied," or "very dissatisfied."



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- 4. When someone selects "dissatisfied," follow-up options are listed to record what made them unhappy. A text message is also immediately sent to a manager who responds by trying to solve the problem.
- 5. Daily customer satisfaction results for each service clerk are immediately displayed, and the results are posted online. The results can be displayed by window, satisfaction rate, or date at any time. The purpose is to gain customer's trust.

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Actively Eliminating Customer Dissatisfaction

Since the launch of the system, 97.82% of customers said they were satisfied, 1.43% listed no opinion, and only 0.75% said they were dissatisfied. That represents a considerable rise in the overall satisfaction rate.

These results, however, were not enough to satisfy the Kaohsiung Motor Vehicle Office. It closely heeds causes of customer dissatisfaction. Follow-up options include "poor customer service attitude," "excessive waiting time," "poor office environment/layout," and "other (such as the explanation of legal regulations)." When someone lists that he is dissatisfied, a supervisor approaches to understand what the customer wants. The office also established three task forces focused on improving a different work area, including creating a friendly environment, innovative service, and unraveling legal questions. The goal is to make service more convenient and transparent, so the office can build good customer relations and improve the agency's image.

Launching the System Nationwide

The system first applied to Banqiao Station (Taipei Motor Vehicle Office) and Tainan Station (Chiayi Motor Vehicle Office). Then on October 21, 2011, the Kaohsiung Motor Vehicle Office introduced it to 13 other motor vehicle offices and stations through a promotional conference that introduced equipment installation and settings. Offices and stations that have not yet begun using the system will do so in 2012.

The system was included in the 3rd Generation Motor Vehicle Information System Establishment Project. It is also now considered a new innovative support system in the DGH's efforts to integrate and customize motor vehicle services. The system won a first class award in innovative management from the MOTC, as part of the ministry's efforts to reward innovative ideas. The recognition brought more confidence and a sense of accomplishment to the development team.

Assembly of Brilliance____

Strong Logistical Support Bolsters Reputation for Excellence

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For years residents in eastern Taiwan have wanted a safe road home. Their wish drew closer when the Executive Yuan approved the Suhua Highway Mountain Section Improvement Project on December 16, 2010.

One of the earliest steps on the path to road construction is obtaining land rights. For early completion of this safe road home, before the Executive Yuan approved the project, the DGH consulted with the land offices to obtain cadastral maps. These allowed it to understand the land data of the construction area, so it could formulate strategies appropriate to each site. It could then quickly obtain the necessary land rights upon approval, letting construction proceed more quickly.

Negotiations that Guarantee Indigenous Rights

More than 90 hectares of land were needed for the Suhua Highway Mountain Section Improvement Project, 26 of which were on the lands reserved for indigenous peoples. According to the Indigenous Peoples Basic Law, the government must consult with and receive approval from the indigenous groups regarding the rights of the land. It also must guarantee the basic rights of the indigenous peoples and ensure their continued survival and development. These regulations presented the DGH with unusual land right difficulties. To ensure the project could meet expectations, the DGH paid visits to the aboriginal township chiefs in Yilan County's Nanao and Hualien County's Sioulin. Negotiations let the DGH overcome the difficulties it

faced.



Indigenous Land Acquisition to Meet Building Needs

The improvement project was broken down into three sections of road – Suao to Dongao, Nanao to Heping, and Hezhong-Daqingshui. Priority was given to the Nanao to Heping section, so the DGH quickly worked to acquire the land needed for this area. In 2011, the DGH acquired 120 parcels of private land from the indigenous peoples for this section of the project. The parcels totaled about 9 hectares. Their acquisition allowed the project to smoothly enter the construction stage.

After acquiring lands for priority areas, the construction of a safe road home could begin. After years of hope among the residents in eastern Taiwan, realization was finally taking place. We firmly believe that the hard work of DGH officials will let improvements to the Suhua Highway proceed as planned and on time. The highway will be transformed into a scenic, beautiful road that is comfortable and safe.

Record Customer Satisfaction for Motor Vehicle Services

Average customer satisfaction at the DGH's five motor vehicle offices and its 26 stations surpassed 80 points again in 2011. These offices achieved an average of 83.19 points (29.6% scored 90 points or above), a growth of 3.25 points compared to the 79.94 average in 2010. The average score was the highest ever.

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Analysis revealed that innovations which improved convenience were the main reason for more satisfied customers. Popular items included the weekend hours, night market service, mobile stations, and commission-free fuel tax payments at post offices and convenience stores.

Praise for the Multiple Fuel Tax Payment Channels

The DGH commissioned a polling agency to survey customer satisfaction at its motor vehicle offices. Among the 2,115 respondents to the telephone survey, 95.0% expressed satisfaction toward service quality (24.6% were extremely satisfied, 56.6% were very satisfied, and 13.8% were generally satisfied). It was an increase of 5.3 percentage points compared to the 89.7% score in 2010. The first among the three items that customers were most satisfied with were commission-free fuel tax payments. These could be made at post offices, convenience stores, and banks, or through special transfers and voice/online services, leading to 95.4% approval. Next came the notification of expired driver's licenses, vehicle registrations, and vehicle inspections (94.5%); followed by the cleanliness of the offices' internal and external environments (92.0%).



Customer Satisfaction toward Motor Vehicle Offices – Average Score and Approval Rating

ltem	Total	Taipei MVO	Hsinchu MVO	Taichung MVO	Chiayi MVO	Kaoshiung MVO
Valid Samples (People)	2,115	421	404	403	467	420
Average Score (Points)	83.19	83.19	83.01	83.19	83.03	83.85
Approval Rating (%)	95.0	97.0	93.4	92.4	96.4	96.5

2011 Launch of the Weekend Hours, Night Market Service, and Mobile Stations – Average Score and Approval Rating

ltem	Valid Samples (People)	Average Score (Points)	Approval Rating (%)
Total	654	88.52	98.6
Night Market Service	100	92.55	100.0
Weekend Hours	289	88.78	100.0
Mobile Stations	265	86.72	96.6

Mobile Motor Vehicle Services Prove to be Popular

Another survey asked people whether they were satisfied with the weekend hours at the DGH motor vehicle offices along with the night market service and the mobile stations. Valid responses were gathered on-site from 654 customers. They gave an average score of 88.52 points (50.3% gave a score of 90 points or higher). The night market service received

a score of 92.55, the weekend hours received an 88.78, and the mobile stations were rated at an average of 86.72 points. When asked if they were satisfied with their overall experience, 98.6% of respondents said yes. Also 100.0% expressed overall satisfaction with the night market service and the weekend hours and 96.6% said they were pleased overall with the mobile stations.

The DGH remains committed to understanding the quality of its motor vehicle services from the perspective of the people who use them. It will therefore continue conducting customer satisfaction surveys while monitoring progress on quality at each of its motor vehicle offices.



Plan the 3rd Generation Motor Vehicle and Driver Information System

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Highway transit is an important part of the modern infrastructure, and its management directly affects a country's competitiveness. As the cornerstone of the highway transit and management system, motor vehicle services are vital. Countries around the world make supervision of drivers and their motor vehicles the focal point of transit system management. For more effective management and better quality, they constantly import the latest technology and tools.

In Taiwan and abroad, government and public services are going digital. Traditional models that use government and corporate entities as the starting point of information development already fail to meet people's expectations. Today's movement to digitalize services must make people and users the focal point. This is the only type of information platform that can satisfy modern service principles, which makes it the only platform that can meet social needs.

Meeting Needs While Raising Flexibility

This project aims to meet current motor vehicle management needs by focusing on service. It also preserves expanded flexibility while building the next generation of information services. Main goals include:

 Establishing Cloud Information Platforms: Additional innovations are on the way to provide more convenient motor vehicle information systems. Cloud services will be used to build practical systems that are always available, raising overall customer satisfaction.



E-Government Conceptual Framework



Innovations of the 3rd Generation Motor Vehicle Services

- 2. Building Green Motor Vehicle Services: The DGH plans to use server consolidation and virtualization to save energy, reduce hardware and lower power consumption needed for air conditioning. These changes will meet its goal of streamlining operations.
- Promoting e-ID: Replacing paper licenses with e-ID would eliminate the need for people to change their licenses. Instead, they would only have to update their information, raising usability and convenience of the motor vehicle systems.
- 4. Building a Greater Variety of Service Channels: Besides enhancing current service channels, the DGH wants to provide more non-traditional channels (such as the multimedia information kiosks at the convenience stores and services at Chunghwa Post Co.). It also wants to enter people's homes (through smart phones, mobile devices, and computers), so it can achieve its goals of anytime, anywhere, any device. These innovations will bring added convenience.
- 5. Sharing Resources: Establishing cloud-based services allows resources to be shared through virtualization. The DGH can use this system to quickly share information with other government agencies. It can improve the quality of cross-departmental work and make it more convenient for people to access public services.

Specializing in Active and Customized Service

There were six principle themes associated with planning the third generation of the motor vehicle services. They included: 1. All-in-one, 2. Two-way participation, 3. Three-network convergence, 4. Four-way integration, 5. Universal, and 6. Six major innovations. Through a one-stop window, people, businesses and civil servants can obtain information released by various government agencies and process applications. A personalized digital assistant and customized assistance also provide an all-new motor vehicle experience.

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Build a Spatial Data and Geo Image Warehouse

Rapid technological advances in recent years have made the acquisition of spatial data more convenient while creating an environment where information equipment is readily available. These conditions have enhanced information sharing and rapid development of the internet, permitting the rise of global geographic information systems (GIS). GIS has been integrated with remote sensing, global positioning systems, and information system APIs, thereby becoming an important new area of information technology that spreads across various disciplines and applications.

Gathering Spatial Data

The DGH took advantage of the common cause principle among government agencies to obtain many spatial data, including aerial photographs, geology data, and road network digital maps. It has already collected more than 140 types of spatial data that can be used for internal, value-added application in 2011. These data were separated into categories such as mountain, water, road, bridge, human, and disaster, and announced at the DGH's computer knowledge base. The knowledge base enhances internal circulation and supplying of the images.

Formulating Operational Guidelines of Data Circulation

On December 16, 2011, the DGH established its "Operational Guidelines of Spatial Data Image Management" and "Operational Guidelines for the Planning, Establishment and Management of the Spatial Data Application Systems." The purpose of these plans was to improve internal data circulation and value-added applications while benefiting management of system planning and establishment.

Using Spatial Data for Highway Disaster Prevention and Rescue

After establishing the Highway Disaster Prevention/Rescuing GIS Decision Support System in 2010, the DGH expanded it in 2011. By adopting open government principles such as open data and WikiGIS, it gathered open information from government agencies and global sources. These data included images and immediate data from joint disaster prevention units. During the flood disaster prevention season in 2011, it used these data to compile Information Analysis Reports for



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▲ Open Government Information and WikiGIS Diagram

Assembly of Brilliance

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typhoons and other extreme weather events. These reports allowed for advanced deployment and early response, ensuring the safety of

Using Spatial Data to Provide Alerts

the road users.

The DGH worked with Chunghwa Telecom to promote the "Highway Disaster Prevention and Rescue LBS Text Messaging and Broadcast Service." Referred as "Emergency Alert System," it was used to send immediate warnings to road users. In 2011 more than 480,000 text messages were sent, alerting road users to leave or avoid entering high-risk areas. Both Chunghwa Telecom and the DGH were awarded the best application at the 7th Gold Map Awards for the service in 2011.

Administrative Achievements Showcased Using **Spatial Data Applications**

The DGH used spatial data technology to exhibit administrative achievements from 2011. It integrated spatial data principles into a display outlining achievements of its Reconstruction Project of Aged Bridge on Provincial Highway. It also applied these principles to a sample service platform for the establishment of its GIS Framework for Construction Management, and a database for Representative Consultation/Inquiry and Inspection. Results were outstanding.



[▲] Won the Best Application at the 7th Gold Map Awards in 2011



▲ Integrated Diagram for GIS Disaster Prevention Information



▲ GIS Exhibition for the Reconstruction Project of Aged Bridge on Provincial Highway

Community Participation and Anti-Corruption

The DGH held the following activities in 2011 to solidify people's opposition to corruption and enhance monitoring by citizens. These activities gathered communities, schools, enterprises, professionals and NGOs, who together opposed corruption and stood for honesty. \bigcirc

Forums with University Students

In 2011 the DGH held an activity in conjunction with the students of National Cheng Kung University and National Taiwan University Department of Civil Engineering. Students in northern and southern Taiwan visited worksites and joined seminars, as part of the DGH's push to get them to observe infrastructure quality more closely. By inspiring students to fulfill their duties as citizens, the DGH encouraged them to act as a link in the community-wide monitoring of infrastructure projects.

Essay Contest on Raising Road Construction Quality

The DGH encourages widespread innovation and youth commitment to public affairs. It considers these vital elements of maintaining roads and bridges. To raise participation, from July 18 to September 15, 2011, the agency conducted an essay contest on raising road construction quality. It had the theme "Go Ahead!" Thirty-five entries were gathered. The essays offered valuable insight to consider for future administrative efforts and inspired people to pay greater attention to road quality issues.





Community Participation in Engineering Office Projects

The DGH finds ways to integrate road activities with community activities, so it can encourage greater monitoring of infrastructure projects by citizens. Through these activities the DGH can explain its policies and its commitment to an honest and competent governance. It can also gain a better understanding of people's needs and expectations toward public construction.

Video to Publicize Free Inspections

To revisit the importance of the vehicle inspections to road safety and clean government, the DGH used the vehicle inspection process as the

theme of a video. The purpose of the video was to remind people that it is illegal for mechanics to request payment for vehicle inspections. The video was posted on YouTube, Facebook, and the DGH website, and it was shown in the motor vehicle offices, classes for inspectors, and contracted private mechanic offices and agencies.

Research and Analysis on National Compensation Cases Pertaining to Road Construction

There are many requests made to the DGH for national compensation after injuries or death due to improper road or bridge construction, maintenance, or management. These situations end as a loselose situation for the people and the government. The DGH therefore commissioned a study by the Formosa Transnational Attorneys at Law. It researched past legal hearings and cases negotiated by the DGH that called for national compensation due to alleged road construction errors. The purpose of the study was to uncover the main



flaws in the DGH road operating system and to offer suggestions for preventing future problems. These suggestions were then provided to construction agencies to use as reference when finding ways to eliminate incidents that lead to national compensation.

Changes to "Highway Newsletter"

Cosmetic Changes to a 26-Year-Old Publication

"Highway Newsletter" began to grow with highway users starting in 1985. As time changed, so did the publication. Its dichromatic beginnings gave way to full color, and it moved from a newspaper to a periodic format. Because it had a limited reporting range and was an internal publication, many people were not aware of it. The DGH therefore considered modifications to make the publication more widespread, so it could promote policies and provide a better understanding of the bureau affairs. After countless meetings and tests, another publication was released that combined the DGH' s strong traditions with new ideas. It was called "Highways of Taiwanese"

Promoting the Hard Work and Achievements of the Highway Staff

Government agencies must communicate with many people when carrying out their duties. Although the DGH serves the people, it must also negotiate with other government agencies

 "Highway Newsletter" Is Released Monthly in a Newspaper Format "Highway Newsletter" Has Accompanied the Staff for 26 Years, Changing from Dichromatic to Full-Color Format

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and accept supervision from various parts of society. Therefore, besides persisting in its daily work, the DGH must place great value on communication. Widespread promotion is a necessary part of its job. When the highway staff meet a mountain they build a road. When they reach water they build a bridge. And when disaster comes they commit their utmost effort to rescue work. In each of these tasks, they remain enthusiastic and warmhearted while serving the people. They research policies that can streamline government while making life more convenient for others to benefit the society. Many of the achievements praised by the customers are disseminated through this shared publication.

Building a Consensus among the Staff and Enhancing the DGH Image

This is a channel for the staff to exchange techniques, promote activities and absorb knowledge. When sharing experiences and thoughts, people can also derive their own benefits. Various columns are planned for the future and the DGH is considering new ways to reach people. It hopes to quickly increase readership of "Highways of Taiwanese" by using multiple communication modes, so it can expand the use of this publication among people who care about the development of the nation's highways. All members of the DGH need to participate in, care about, acknowledge, and assist in spreading this publication. Then the agency's hard work and achievements will be more visible.



Improving Transportation to Build a Sustainable, Happy Living Environment

Competition Performance

Year

Awards Received by DGH Units in 2011

Award Name	Placement	Recipient
Shihmen Reservoir and Its Catchment Area Management Project - Land and Soil Preservation for Roads (Overseen by the Executive Yuan)	1st Class	First Maintenance Office
Golden Way Award for Construction Excellence	2nd Place	Jhuolan Construction Office
Golden Way Award for Landscaping	1st Place	Third Maintenance Office
Golden Way Award for Driver Information	1st Place	Fenggang Construction Branch
Golden Way Award for Outstanding Construction	4th Place	Fenggang Construction Branch
Golden Way Award for Road Maintenance	1st Place	Hualien Construction Branch
East-West Expressway Road Network Improvement Project (Overseen by the Executive Yuan)	1st Class	Kao-Nan Region Construction Office for the East-West Expressway
Taipei County Special Highway No. 2 Construction Project (Managed by the Executive Yuan)	1st Class	West Coast Expressway Northern Region Temporary Engineering Office
West Coast Expressway Construction Follow-Up Project (Overseen by the Executive Yuan)	1st Class	West Coast Expressway Northern Region Temporary Engineering Office
East-West Expressway Road Network Improvement Project (Overseen by the Executive Yuan)	1st Class	West Coast Expressway Northern Region Temporary Engineering Office
West Coast Expressway Construction Follow-Up Project (Overseen by the Executive Yuan)	1st Class	West Coast Expressway Central Region Engineering Office
East-West Expressway Construction Project and Network Improvement Project (Overseen by the Executive Yuan)	1st Class	West Coast Expressway Central Region Engineering Office
West Coast Expressway Construction Follow-Up Project (Overseen by the Executive Yuan)	1st Class	West Coast Expressway Southern Region Temporary Engineering Office
East-West Expressway Construction Project and Network Improvement Project (Overseen by the Executive Yuan)	1st Class	West Coast Expressway Southern Region Temporary Engineering Office
Fuel Tax Collection Performance by Motor Vehicles Administration Units	Excellent Performance	Taipei Motor Vehicle Office
Gravel Truck Safety Management, Awarded by the Executive Yuan Under the Improvement Program for Traffic Order and Safety	1st Place	Taipei Motor Vehicle Office
3rd MOTC Service Quality Awards, Front Line Service Agency	Outstanding Performance	Banqiao Motor Vehicle Station
Fuel Tax Collection Performance by Motor Vehicle Administration Units	Excellent Performance	Hsinchu Motor Vehicle Office
Highway Supervision, Group 2, Awarded by the Executive Yuan Under the Improvement Program for Traffic Order and Safety	1st Place	Miaoli Motor Vehicle Station
Fuel Tax Collection Performance by Motor Vehicle Administration Units	Excellent Performance	Taichung Motor Vehicle Office
Motor Vehicle Freight Traffic Survey	1st Place	Taichung Motor Vehicle Office
Fuel Tax Collection Performance by Motor Vehicle Administration Units	Excellent Performance	Chiayi Motor Vehicle Office
Top Recommendations by Executive Yuan Agencies - Public Service and Care for the Disadvantaged	Honorary Award	Chiayi Motor Vehicle Office
The 3rd MOTC Service Quality Awards, Front Line Service Agency	Outstanding Performance	Tainan Motor Vehicle Station
Highway Supervision, Group 1, Awarded by the Executive Yuan Under the Improvement Program for Traffic Order and Safety	1st Place	Kaohsiung Motor Vehicle Office
MOTC 3rd Innovative Contributions in Road Safety Awards, Highway Supervision Group	1st Place	Kaohsiung Motor Vehicle Office
Executive Yuan Information Security, External Audit Comparison	First Level	Kaohsiung Motor Vehicle Office

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Research and Development

Autonomous Research and Development Achievements

Number	Research Items	Research Agency	Research Personnel
1	Effectiveness of the Evening Motor Vehicle Services	Taipei Motor Vehicle Office, Banqiao Motor Vehicle Station	Zhang Zhao-yang, Jiang Shu- ren, Lin Zhao-huang, Zheng Bao-feng, Zhen Yan-ling, Zhang Yu-qian, Xu Jia-lin
2	Exit Poll on Motor Vehicle Services	Kaohsiung Motor Vehicle Office	Liu Yu-lin, Chang Yi-xun, Li Hui- hong, Cai Yu-ying, Shi Zhan- hong, Zhang Zheng-xiang, Zeng Yi-ming, Zhen Qiu-dong
3	Movement Toward Paperless Vehicle Inspection Forms(Including Outsourced Inspections)	Taipei Motor Vehicle Office	Zhang Zhao-yang, Weng Shu- huo, Lai Ming-yi, Song Ben-li, Zhen Shou-zhong, Lin Chong-yu
4	Computerizing Vehicle Inspections and Researching Customer Satisfaction	Chiayi Motor Vehicle Office, Yunlin Motor Vehicle Station	Zhen Jun-zhe, Zhen Qi-wen, Huang Ji-yuan
5	Effects of 3 Bar Codes on Compulsory Payment Stubs	Taipei Motor Vehicle Office	Zhang Zhao-yang, Weng Shu- huo, Huang Ming-zhen, Zhen Yong-hong, Zeng Xsiao-fen
6	Digital Learning Platform	Chiayi Motor Vehicle Office, Data Processing Unit	Lu Jun-hong, Su Ying-he

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Major Events

Month

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Prospect for Glory

An opening ceremony was held for Nanhua Bridge, which was part of the Urgent Reconstruction Project of Aged and Damaged Bridges on Provincial Highways. President Ma Ying-jeou, Premier Wu Den-yih and MOTC Minister Mao Chi-kuo hosted the event. A ceremony was held to mark the completion of the Xincishan Bridge on Provincial Highway No. 28. President Ma Ying-jeou, Kaohsiung Mayor Chen Chu and MOTC

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18 The Xinpi Bridge on Provincial Highway No. 1 opened to traffic heading south (it had opened to traffic heading north on January 18, 2010). The bridge is located in the Linbian River valley and was designed using long span prestressed box culverts. It has become a new landmark for Pingtung County's Xinpi and Jiadong townships.

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Minister Mao Chi-kuo hosted the event.

29 A groundbreaking ceremony was held for the Heping Section bridge project that is a part of the Suhua Highway Mountain Section Improvement Project (on Provincial Highway No. 9). President Ma Ying-jeou, Premier Wu Den-yih and MOTC Minister Mao Chi-kuo hosted the event. The bridge is scheduled to be finished in May 2014 while the entire highway is expected to be open to traffic at the end of 2017.

Month

- 2 Laiji Bridge, at the 49K+000 mark of County Highway No. 149 in Laiji Village, reopened to traffic. The bridge that connects Tsaoling, Laiji, Taihe and Fenqihu by crossing the Alishan River had been destroyed by Typhoon Morakot.
- Side Bridge, at the 236K+650 mark of Provincial Highway No. 21, reopened to traffic. 2 The bridge, which connects Jiashian with Wulipu and is important to Namasia District, had been destroyed by Typhoon Morakot. It was rebuilt as a steel box girder bridge.
- 11 Reconstruction Project of Aged and Damaged Bridges on Provincial Highways Guohsing Bridge, on Provincial Highway No. 17 over the Tsengwen River, completely reopened following reconstruction to piers 18-33. After reopening, the bridge again had two lanes heading both north and south. It opened before the Lantern Festival to provide a safe, convenient driving environment.

Month

5 Urgent Reconstruction Project of Aged and Damaged Bridges on Provincial Highways -A ceremony was held to mark the opening of Ligang Bridge, on Provincial Highway No. 3 in Pingtung County's Ligang Township. President Ma Ying-jeou, Premier Wu Denyih and MOTC Minister Mao Chi-kuo hosted the event. The bridge opened to traffic the following day.

Directorate General of Highways, MOTC Annual Report 2011 Prospect for Glory

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11	At 3:30 p.m. the DGH launched an emergency response task force to deal with ramifications of a potential tsunami. Provincial Highways No. 2, 9, 11, and 15, along with Expressway No. 61, were closed as a precaution and the DGH kept close watch on all highways under its jurisdiction. When inspections showed that there was no tsunami threat, the closed roads were open at 6:30 p.m. To give people immediate information so they could respond early, when the tsunami warning was in place the DGH sent close to 48,000 text messages using location-based service. The messages called for people in coastal areas to exercise caution while a content management system was used to warn road users.
21	Bridge work began for the Heping section of the Provincial Highway No. 9 Suhua Highway Mountain Section Improvement Project.
28-30	To promote smooth completion of the Suhua Highway Mountain Section Improvement Project, the DGH held the International Forum on Construction Technologies for Highways under Complicated Geological Conditions. Tunnel and bridge experts from around the world were invited to share ideas.
6	Over six days from April 1 to 6, the DGH completed the 2011 Tomb Sweeping Festival Traffic Management and Safety Project. The project helped people return home to attend to the graves of their ancestors. Buses made 68,769 journeys on freeways, carrying 1,400,094 passengers. Local buses made 96,280 journeys, carrying 1,540,236 passengers.
14	Safety regulations related to licensing and road management of industrial equipment were amended. The amendment was signed by members of the DGH and issued by the Ministry of the Interior. Implementation occurred on April 15.
14	The first tender for the Changhua Coastal Access Road, from Keliao to Chuancuo (0k~2k+570) was finished. The access road heads east from the Changhua Coastal Industrial Park, connecting the park to the Hemei Interchange on National Freeway No. 3 via Provincial Highway No. 17 and County Highway No. 139.
15 5 _{Month}	Widening on Provincial Highway No. 9 from 222K+400 to 228K+900 (Hualien County Fengtian - Sikou) was completed, expanding the road from two to four lanes. The improvements enabled the road to handle heavy tourist traffic on weekends and holidays.
13	The Nantian to Anshuo section of the Syuhai to Anshuo road expansion project opened to traffic. The new road along Provincial Highway No. 26 made traffic more convenient for Nantian Village residents.
14	A groundbreaking ceremony was held for Nantaimali Bridge on Provincial Highway No. 9. President Ma Ying-jeou, Premier Wu Den-yih and MOTC Minister Mao Chi-kuo hosted the event.

17 Widening was finished on Provincial Highway No. 9, 230K+820-233K+834. The improvements reduced traffic jams.

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The DGH showed the premiere of a video to celebrate the release of the book "Bonjour! Highway 9." Guests included MOTC Minister Mao Chi-kuo, DGH Director General Wu Men-Feng and documentary director Yang Li-chou, who helped produce the book.



- 4 The new Sinfa Bridge was completed and opened to traffic. A donation from China Steel led to the rebuilding of the bridge on Provincial Highway No. 27, which was destroyed by Typhoon Morakot. President Ma Ying-jeou, Premier Wu Den-yih and MOTC Minister Mao Chi-kuo hosted the event.
- A ceremony was held from 9-11 a.m. to mark the opening of Guohsing Bridge, on County Highway No. 133 (5K+905). The bridge opened to traffic at 11:30 a.m.
- 27 In 2010 evaluation of projects, the MOTC rated two of the DGH's projects as excellent: the Provincial Highway No. 9 Huadong Highway Third Stage Improvement Project (Ministry/Department Project), and the West Coast Expressway - Budai Harbor, Nanhang Bridge, and Wuqi Ramp Construction Project (Autonomous Management).
- 28 On the Taipei County Special Highway No. 2 project, the work was completed on Bid 4-3, from the Dahan River to Tucheng Interchange.



1 To accommodate the independent travel of Mainland Chinese tourists, the DGH negotiated with the Yuanlin Bus Company to open the Sun Moon Lake - Dongpu route. Starting from July 1 for six months it ran six bus round trips on the route each day.

The DGH began handing out new driver's licenses from July 1. Drivers with licenses that were still valid could keep using the old version until it was expired or came up for renewal. Indigenous people who wanted to change to their traditional name could switch to a new license free of charge as long as their original license was still valid.

19 The road expansion project from 243K+600~246K+650 on Provincial Highway No. 9 opened to traffic. The project involved making an outer ring along Changqiao Road on the Huadong Highway. The road runs from the south end of Wanli River Bridge in Hualien County's Fenglin The road runs from the south end of Wanli River Bridge in Hualien County's Fenglin

Township to the north end of the Matai'an River Bridge. It is 3.05 km long and has four fast lanes, two slow lanes and two bicycle lanes, running in each direction. The new road can reduce traffic jams on the Changqiao Bridge and Lintian Mountain sections of road.

- 23 The DGH held an exhibition to showcase its achievements and a sports event for the staff. The event was to honor the DGH's 65th anniversary and the ROC centenary. Premier Wu Den-yih and Chen Wei-jen, the administrative deputy minister of the MOTC joined the event at New Taipei's Sanchong Multipurpose Sports Complex. Over 2,000 people participated, including the staff, their families and other citizens.
- 30 A ceremony was held to mark the opening of the Budai Harbor/Nanhang Bridge section of road in Chiayi County on the West Coast Expressway. Premier Wu Den-yih and MOTC Minister Mao Chi-kuo hosted the event. The new road connects Yunlin, Chiayi and Tainan on the West Coast Expressway. It can save 20 minutes or more for some drivers and stimulate local tourism and industry.

Prospect for Glory



- 13 A groundbreaking ceremony was held for an expansion project to the Changhua Coastal Industrial Park section of the West Coast Expressway. Premier Wu Den-yih and MOTC Minister Mao Chi-kuo hosted the ceremony.
- 20 A prayer ceremony took place for the rebuilding of the No. 1 Bridge on Provincial Highway No. 24 (Yila Bridge), which was destroyed by Typhoon Morakot. MOTC Minister Mao Chi-kuo presided over the event.

- 8 In 2011 the MOTC gathered innovative ideas. After a review of the proposals, it gave first class awards in innovative management to the Taipei Motor Vehicle Office, for its online license plate service for small, personal use vehicles, and the Kaohsiung Motor Vehicle Office, for its customer satisfaction e-survey. The Kaohsiung office also won a creative management award for its traffic safety promotion "How much heartbreak have you caused your loved ones?" and was commended in the ministry's newsletter.
- 29 The DGH held a press conference and began to use sit-in rules it established for the Suhua Highway Mountain Section Improvement Project. The rules govern guests at meetings of the task force responsible for environmental protection monitoring.
- 30 The DGH held a "highway fans" conference. It invited people known for offering highway suggestions on social networks along with fans of highways. The DGH director general was also present. He said he wanted to share ideas with road users to help maintain Taiwan's highway network.

- 2 A ceremony was held to mark the opening of the Siaying System Interchange which head east from Sun Yat-sen Freeway to Provincial Highway No. 19. The system lies on the Beimen/Yujin Line of the East-West Expressway. MOTC Minister Mao Chi-kuo and Tainan Mayor William Lai presided over the morning ceremony, and the road opened later that day.
- 11 The DGH completed its Double Tenth Day plan for safe traffic dispersion. The plan was conducted by each motor vehicle office to let people return to their hometowns safely.
- 15 A ceremony was held to mark the opening of the Changhua Coastal Access Road (Expressway 61B). MOTC Minister Mao Chi-kuo and Changhua County Commissioner Cho Po-yuan presided over the event. Once the new road opened in the afternoon, drivers could directly reach the West Coast Expressway (61) from National Freeway No. 3, without navigating through local roads. It shortened commutes by 20-30 minutes, raising transportation efficiency for the Changhua Coastal Industrial Park and the Chuansing Industrial Park.

A ceremony was held to mark the opening of the Banqiao to Tucheng section of 21 Expressway No. 65. Premier Wu Den-yih, New Taipei City Mayor Eric Liluan Chu, and MOTC Minister Mao Chi-kuo hosted the event. Once the road opened the following morning, drivers no longer needed to take a detour on Provincial Highway No. 3 (Tucheng's Zhongyang Road), saving 10 minutes or more.

- 26 The MOTC held an awards ceremony to showcase achievements from the 2011 Bus Tour around Taiwan.
- 28 The DGH held an activity in conjunction with the National Cheng Kung University Department of Civil Engineering. Students visited worksites and joined seminars as a part of the DGH's efforts to encourage students to observe infrastructure quality more closely.
- 29 A first review on how "the Tamkang Bridge project and access roads" would change the local environment was conducted on September 27. Then on October 29 and 30, a public hearing took place on the project's environmental impact assessment.
- 30 Work was completed on Tender E610, along the Dongshih to Chiavi section of the East-West Expressway. The work was from Dongshih to the West Coast Expressway, 0K+525~2K+080.
- The government undertook a plan to centralize motor vehicle services. On October 31 31 the MOTC announced Executive Yuan approval to return four offices to the DGH, including the offices in Taipei, Kaohsiung, Kinmen and Lienchiang. The changes took effect on January 1, 2012.



- Starting from October 14, the DGH Training Institute began recruiting student drivers to join a trial road exam. On December 7, 33 new drivers from the institute who had just passed the enclosed area driver's test on December 2 tried the road exam. Seventeen, or 51.5%, passed.
- 16 The Kaohsiung Motor Vehicle Office and the Taichung Motor Vehicle Office, which are both under the DGH, won an award for agencies specializing in front-line service at the MOTC's 4th Service Quality Awards.
- 23 At the conclusion of an emergency rebuilding project, Vice Premier Sean Chen and MOTC Minister Mao Chi-kuo presided over a ceremony to commemorate the reopening of the Shuangyuan Bridge. The Provincial Highway No. 17 (248K+100~251K+000) bridge officially reopened the following day. Transportation quality was better than when the original bridge was in place, providing a significant boost to tourism, distribution of agricultural products, and local economic development.
- 23 Third stage, pre-opening testing was finished on the main line viaduct (Songchu Road to National Freeway No. 3 Wufeng Interchange). The project was a part of the Taichung Living Circle, Route 4, North Section and Dali Access Road (Expressway No. 74).

2011 Annual Report Directorate General of Highways, MOTC

Publishing Agency: Directorate General of Highways, MOTC Publishing Date: July 2012 Publishing Manager: Wu Men-Feng Address: No. 70, Sec. 1, Zhongxiao W. Rd. Zhongzheng District, Taipei 10041 Phone: (02) 2311-3456 Website: http://www.thb.gov.tw/tm/Menus/Menu09/Default.aspx

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Compilation: Secretariat (02) 23113456

Design: ARTECK Creative Consultants, Inc.

Phone: (02) 8797-7333

First Edition: July 2012

GPN: 1010101503

ISBN : 978-986-03-3185-1 (Paperback includes a DVD)

Price: NT\$500

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GPN : 1010101503 Price : NT\$500