

The Republic of the Philippines  
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS



## TYPHOON YOLANDA (HAIYAN) REHABILITATION AND RECOVERY

Enhancing Resilience Through Quality Infrastructure  
and Operations

Director DANTE B. POTANTE  
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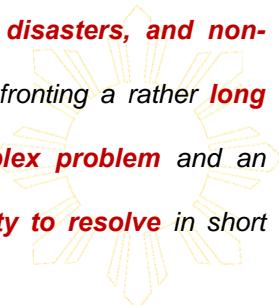
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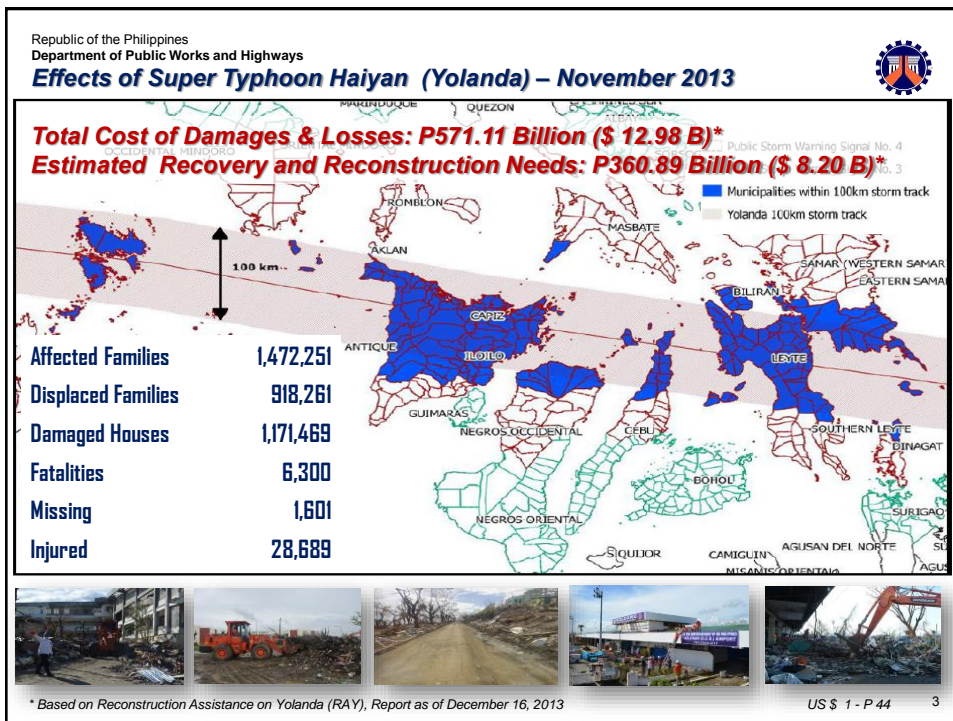
**Enhancing Resilience Through Quality Infrastructure and Operations**



***“Resilience in building and infrastructure design is not new.”***

*Architects and Engineers have always addressed **natural and human-made hazards**. However, with impending severe **global warming, climate change, more catastrophic disasters, and non-sustainable land use problems**, we are re-confronting a rather **long existing, but only partially recognized, complex problem** and an **incompletely defined problem set for humanity to resolve** in short order and with dwindling resources.*





## Lessons Learned:

### I. Build Back Better Policy

- Need for Structural Measures (More Resilient & Better Designed Structures)
- Lack of Non-Structural Measures (Early Warning, Policy Changes, Community Awareness)
- Need for capacity building of National Government Agencies & Local Government Units (Land use and infrastructure planning, Modernization of weather forecasting and warning system, Quick response and coordination)
- Inadequate resilient public infrastructure facilities for emergency situations

### II. Strategic Policies

- Created Cabinet-level Climate Change Commission
- Adoption of Integrated Water Resource Management (IWRM) principles
- Implement River Basin Approach to Flood Management and Water Optimization

### III. Disaster Risk Reduction Management (DRRM) Structure

- Permanent, fully-staffed Disaster Risk Reduction Management Office
- Better coordination with Humanitarian Organizations (UN, WB, JICA, ADB, Red Cross, etc.)

## Structural Resiliency Program Principles:



- Every peso of investment in resiliency and risk reduction will save **5-7 times in reconstruction and rehabilitation costs.**
- Non-engineered houses of **poor and vulnerable families** are the most at risk.
- Disaster Risk Management involves **all levels of society.**
- Proper use of **hazard maps and science-based data** for planning.
- **Social Resilience** is also important component of DRRM Program



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**PROCESS IMPROVEMENT**



As of 2010	As of 2014	As of 2016
<b>Quality Standard and Design</b>		
<ul style="list-style-type: none"> <li>• Frequent occurrence of flood and landslides due to unpredictable environmental changes. <b>No flood control master plan for major rivers.</b></li> <li>• 10 year flood return design standard.</li> <li>• Upgrading of design of bridges</li> <li>• Frequent deterioration of roads due to overloading.</li> <li>• Coverage of quality audits of projects was 15%.</li> </ul>	<ul style="list-style-type: none"> <li>• Increase the minimum flood return periods to be used for <b>the design of flood control and road drainage facilities/structures for 25-50 years.</b></li> <li>• Use <b>bio-engineering solutions for slope protection works</b> in road and flood control projects.</li> <li>• <b>Developed new construction design standards and specifications</b> – upgrade drainage specifications, slope protection &amp; soil erosion control, widening of national roads;</li> <li>• LRFD Design of Bridges, seismic acceleration map</li> <li>• <b>Increase the minimum thickness of concrete pavement</b> from 230mm to 280mm or 300 mm .</li> <li>• Standardized design of Farm to Market Roads (250mm PCCP x 5m wide)</li> <li>• Issued guidelines on overloading.</li> <li>• <b>Outsource project inspection and quality assurance</b></li> <li>• Increased of coverage of quality audits of projects to 33%</li> </ul>	<ul style="list-style-type: none"> <li>• Wider use of environment friendly construction materials in road and flood control projects such as stabilization of road base and beds of waterways.</li> <li>• Achieve durable roads with better riding quality.</li> <li>• Increase coverage of quality audits of projects from 33% to 50%</li> </ul>