



Post-Earthquake Business Recovery: Learning from Japan's Experiences

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Executive Summary

This project is part of the California Seismic Safety Commission's (CSSC) goal of developing effective strategies to accelerate post-earthquake economic recovery. The goal is to learn from the experiences of Japan's national and local governments, and Japanese companies in California, and utilize these lessons in further developing California's post-earthquake economic recovery strategies. In addition to field studies of Japanese national and local government strategies and policies, Japanese companies operating in California were also surveyed to find out what they anticipated their post-earthquake needs would be, in order to expedite their recovery.

The **findings** from previous CSSC Projects, case studies, and survey of Japanese companies in California are consistent. Important factors include: (a) Finances - availability of capital, financial assistance and incentives, (b) Restoration of lifelines and infrastructure, (c) Post-disaster communications, (d) Restoration of the supply chain, (e) Business continuity planning, and (f) Cooperation among public and private sectors and residents.

It is **recommended** that the California Seismic Safety Commission build on this and previous projects by establishing an *ad hoc* subcommittee to engage a broader group of California companies, representing all sectors of the economy, and seek their contributions to identify policies and strategies that have the potential for speeding post-disaster economic recovery. Japanese companies in California are in a unique position to contribute to this effort.



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Motivation

- California's robust \$2.7 trillion economy is 5th largest in the world
- Major earthquake faults intersect heavily urbanized and industrialized regions
 - Silicon Valley and San Francisco Bay Area
 - Greater Los Angeles area
- A major EQ, in addition to loss of life and property, can damage this economic base, resulting in California losing its leadership role.
- The CSSC has:
 - Recognized the importance of economic recovery for post-disaster community building
 - Initiated projects to identify and develop strategies that can mitigate the damaging effects of earthquakes and accelerate economic recovery of the State
 - Earlier efforts focused on loss reduction
 - California Earthquake Loss Reduction Plans – (CSSC 02-02; CSSC 07-02, CSSC 13-03)
 - Strategic planning documents for seismic risk and damage reduction
 - Identified actions necessary to reduce risk over the long term
 - Emphasis on built environment and public sector recovery



Past, Current and Future Efforts

- Learn from past experiences
- Find out what the “customer” needs
- Take steps now to ensure that the “customer” gets what is needed when it is needed
- Enable/accelerate private sector recovery
- Phase I: Post-Disaster Rapid Economic Recovery (CSSC 12-02)
- Phase II: California Small Business Development Center’s Disaster Resource Guide (CSSC 14-04)
 - Outsmart Disaster Campaign
- Phase III: Learning from Japan’s Experiences (*This project*)
 - Brief investigation of post-Tohoku EQ policies & strategies, Kobe EQ, Niigata Chuetsu EQ
 - Survey Japanese companies in California for their post-disaster prioritized needs (*Pilot*)
- Phase IV: Identify the needs of a broader spectrum of California companies for their post-disaster recovery needs, building on lessons learned in the first three phases
- Outcomes for building a more resilient California:
 - Develop sustainable post-disaster economic recovery strategies
 - Make recommendations to decision makers, i.e., governor, legislature, local governments, businesses and industry
 - Develop cost-effective partnerships



Post-Disaster Rapid Economic Recovery (CSSC 12-02)

- Identified five key areas for achieving rapid economic recovery
 - Restore lifelines and reduce government bottlenecks
 - Enable emergency capital
 - Establish a strong communications plan
 - Encourage a sense of ownership and shared commitment to recovery
 - Conduct planning across state, business, community partners, and residents



California Small Business Development Centers (SBDC) Disaster Resource Guide (CSSC 14-04)

- Gathered best practices from sister SBDCs that had experienced natural disasters in other states
- Detailed and thorough
- Readable format, with checklists and worksheets to help the small business owner before and after a disaster to assess their needs
- Provides contact information for agencies
- Provides insurance related information, including the claims process

Outsmart Disaster Campaign

- Improve communication
- Understand and inform actions
- Build capacity to respond and recover



Learning from Japan's Experiences - Why Japan?

- Despite experiencing several damaging earthquakes ($M > 7.0$) in last 50 years, industries, urban areas, and the economy have continued to grow
- Damaging earthquakes include:
 - Kobe Earthquake (Hanshin Awaji Dai Shinsai) Jan 17, 1995 (M 7.2)
 - Niigata-ken Chuetsu-oki Earthquake, July 16, 2007 (M 6.6)
 - Tohoku Earthquake (Higashi Nihon Dai Shinsai) Mar 11, 2011 (M 9.3)
- Learning opportunity for California
 - Case Studies/Lessons for Economic Recovery



Why Japanese Companies in California

- 1,703 Japanese companies in California in 2018
 - Employment: approx. 165,000
 - More than 90% local hires
 - Annual payroll \$15.3 billion
 - Leadership personnel have experienced the damaging effects of earthquakes and recovery
 - Knowledgeable about factors that can impede the recovery process
 - Keen interest to learn more about the kind(s) of assistance they can expect from US federal, state and local governments to expedite their recovery



Kobe Earthquake

- Jan 17, 1995, 5:46 a.m.; Richter magnitude 7.2
 - Intensity: MMI 11 ~ 12
 - Widespread damage
 - Deaths: greater than 6,000
 - Injuries: greater than 35,000
 - Damage to built environment: greater than US\$ 120 billion
 - Damage including “business losses”: greater than US\$ 200 billion
 - Structures damaged: greater than 20,000



Kobe EQ: Lessons Learned - 1

- Earthquakes can occur anywhere, anytime
 - The Kansai region in general, and Hyogo Prefecture in particular, were thought to be “earthquake free” until this event
 - Even after the Kobe EQ it was popularly being referred to as a “once in a thousand years” earthquake
 - Prediction in 1976 of the future M 8 Tokai EQ and another major EQ under Tokyo were thought to have resulted in the lack of preparation in other parts of Japan, despite relatively frequent occurrence of earthquakes elsewhere
 - Ability to “predict” earthquake occurrences was called into question
- Fires following earthquakes
 - The widespread fires that followed this earthquake were responsible for a significant part of the damage and life loss
 - The “chemical shoes” industry, primarily small businesses, was practically all burned down
 - Production facilities, offices, warehouses and residences were burned



Kobe EQ: Lessons Learned - 2

- Integrity of the Supply Chain is crucial
 - **The weakest link determines the strength of the chain**
 - “Economic damage” extended beyond the region that was directly affected by the earthquake
 - Many production plants located outside the affected area had to cease production because they had suppliers in the Kobe region who suffered damage and were not able to ship necessary parts
 - Toyota in Nagoya, Honda in Kumamoto, Mazda in Hiroshima, numerous others
 - “Sole sourcing” resulted in the lack of alternate suppliers
 - The Japanese *keiretsu* system of industrial relationships contributes to sole sourcing
 - The Just-in-Time approach to delivery of parts necessary for production; in time delivery of parts was not possible due to extensive damage to transportation networks
 - Securing alternate suppliers, after the earthquake, was problematic



Kobe EQ: Lessons Learned - 3

- Global effects
 - Disasters in one country/region can affect the economy in other countries/regions
 - Extensive damage to port facilities affected ability to ship parts in a timely manner
 - Production plants in Brazil and Malaysia had to halt production due to Mitsubishi's and Daihatsu's inability to ship parts, caused by extensive damage to Kobe port
 - Two Japanese companies (Hoshiden and DTI) accounted for 70% of world production of Liquid Crystal Displays
- Infrastructure integrity
 - Even if there was no damage, numerous companies ceased operations due to lack of functional infrastructure, i.e., availability of power, water, fuel, gas, transportation, communications capability; standby/backup capabilities for these systems were lacking
 - E.g. 174 factories stopped production due to loss of water supply



Kobe EQ: Lessons Learned - 4

- Reliable communications networks
 - Reliable & disaster-resistant communications networks
 - Relay correct information, in a standardized transmission and reception format to avoid misinterpretations
 - Today, computing capability and internet access are essential infrastructures
- Adequate emergency planning and preparedness
 - Arrangements for lodging and food for employees, especially those from outside affected region
 - This was also an issue in the Ridgecrest Earthquake Sequence in July 2019
 - Business continuity planning (BCP), including training in execution of the plan



Niigata Chu-etsu-Oki Earthquake

- July 16, 2007, 10:13 a.m.; Richter magnitude 6.6
 - Deaths: 14
 - Injuries: 2,315
 - Property losses: US 12.8 billion
- National and Prefectural governments helped local governments (Kashiwazaki, Kariwa) and other affected communities to respond to, and recover from, the EQ
 - GIS used to identify highest priority needs and quickly direct resources
 - Japanese national government established US \$1.4 billion recovery fund
- Requests for volunteers with specific expertise were issued – 19,926 volunteers mobilized to assist in recovery
 - Companies from all over Japan provided industry-specific skilled workers to help accelerate recovery



Riken Corporation – Spontaneous Mutual Aid

- Riken manufactures approx. 50% of all piston rings used by automobile industry in Japan
- 1,741 employees produce: (a) 31 million piston rings and (b) 580 million compressor rings per month
 - Additional 1,400 employed by Riken's suppliers in the region
- Riken had experienced the 2004 Niigata Chuetsu earthquake and had taken steps to mitigate potential damage, including: structural and non-structural retrofits, emergency preparedness, and business continuity planning
- 96% of Riken's employees reported for work after the earthquake
- After the earthquake, many companies, including clients, from all over Japan provided 850 skilled volunteers with relevant expertise to accelerate the recovery which was fully completed by Aug 11th (less than one month)
- Losses estimated at approx. US \$ 10 million
- Overall impact to the automobile industry minimized by automobile industry assisting Riken recover rapidly



Niigata Chu-etsu EQ: Lessons Learned

- Support and assistance from “higher levels” effective in speeding recovery
 - Assistance from other companies that had Riken as part of their supply chain
 - National government recovery fund
- Use of technology to identify needs and direct resources
- Support, assistance, cooperation among the private sector effective in minimizing damage and expediting recovery
- Risk assessment and mitigation effective in reducing damage and economic consequences



Great Tohoku, Japan Earthquake

- March 7, 2011, 2:46 p.m.; Richter magnitude 9.3
 - 5th largest in recorded history
 - First ever “triple disaster”
 - Massive EQ (M 9.3) + tsunami (30 m) + nuclear reactor explosion
- Extensive damage
 - Deaths: greater than 15,000, missing: 2558
 - Damage to built environment: greater than US \$ 200 billion
 - Expected to increase to US\$ 235 billion
 - Structures damaged: greater than 20,000



Japan's Response

- National, prefectural and local governments responded in a unified manner
 - National government took the lead
 - Basic Guidelines for Reconstruction & Recovery issued in July 2011
 - Long term view
 - Time frame for reconstruction set as 10 years, with first five years targeted as period of intensive recovery
 - National Reconstruction & Recovery Agency established on Feb 10, 2012
 - Oversee, facilitate and drive the recovery
 - Staffing: Approx 1,000, all on loan from other agencies
 - To be dissolved in 10 years (Feb 2022)
 - Uniform emphasis on all aspects of recovery, not just economic
 - Rebuilding the lives of residents and their communities
 - Rebuilding of communities with improved disaster resilience
 - Health care, including mental health
 - Relocation assistance: US\$6,000 to US\$30,000 per household
 - Numerous other initiatives, both near term and long term



Group Subsidy

Novel, new approach to economic recovery

- Direct subsidy (grant) from governments to private sector
- “Groups” must consist of businesses that have a supply-chain relationship
- Emphasis on small and medium sized enterprises (SME)
- Demonstrated potential contribution to regional recovery and employment of local residents
- Develop business plan including budget, apply for funding via the prefectural government to the national government
- If approved: national government funds 50% and prefectural government 25% of budget
- Possibility of local government providing an additional 12.5 % funding
 - Maximum potential government subsidy: 87.5%
 - Maximum funding per project US\$30 million
- Number of groups funded: Approx 700; Approx 11,350 businesses involved
- Total funding provided (national and prefectural): approx. US \$5 billion



Survey of Japanese Companies in California

- Japanese Companies in California surveyed to find out what their post-EQ needs would be, for rapid recovery
 - What strategies can the public sector adopt to aid and accelerate their recovery
- Survey developed based on CSSC 13-03; 85 questions divided into 10 sections. Responses based on Likert scale – 1 for *strongly disagree* to 5 for *strongly agree*
- Japanese Business Association (JBA) and Japanese Chamber of Commerce Northern California (JCCNC) cooperated by distributing survey to all of their members
- 52 respondents completed the entire survey
- Topics eliciting a response of 4.1 or higher were considered to be important for these companies.
- Survey contained in Appendix A
- Detailed results in Appendix B



Survey Findings: Topics of Importance - 1

- Availability of capital and financial assistance
 - Expedited insurance payments
 - Interest-free loans
 - Assistance for renting alternate facilities
- Outreach from local governments
 - One-stop shop to expedite rebuilding, including permitting
 - Updates on progress of recovery and restoration of services
 - Updates, warnings on potential/new earthquake-caused hazards
 - Incentive programs for rapid rebuilding
- Employee/employment assistance from local governments
 - Assist workers to return to work as soon as possible
 - Direct payments to employees to help them cover expenses
 - Automatically enroll affected employees in unemployment programs



Survey Findings: Topics of Importance - 2

- Tax relief, credits, incentives
 - Tax relief for real property losses
 - Tax relief for opportunity (business) losses
 - Tax credits for maintaining employment at pre-earthquake levels
 - Tax incentives for investment/staying in the area
 - Temporary sales tax exemption for businesses that rebuild
 - Declaration of earthquake-affected regions as “Enterprise Zones”, with extended tax credit periods
- Direct government services
 - Expedited debris removal
 - Provision of safe access to business facilities
- Utilities/Lifelines
 - Quick restoration of all utilities: water, natural gas, electricity, sewers, communications (phone, internet)



Survey Findings: Topics of Importance - 3

- Transportation
 - Provide emergency transportation for employees, supplies, and products
 - Restore roads, air transportation, railways, ports
 - Clear identification of alternate transportation routes
- Elements for Business Recovery
 - Develop and practice comprehensive business recovery/continuity plan
 - Food and other provisions for longer than 72 hours
 - Develop and implement procedure for gathering, analyzing and reporting data on earthquake's impact to corporate decision makers
 - Designate individuals to report injuries, deaths, damages, and resources needed, to emergency services, employees' families and appropriate authorities
 - Provide professional guidance on dealing with critical stress management
 - This need was also recognized after the Ridgecrest Earthquake Sequence
 - Provide transportation for employees and/or work crews



Overall Project Findings

Findings from previous CSSC Projects and this project, including case studies of Japanese earthquakes and survey of Japanese companies in California, are consistent. Important factors include:

- Availability of capital for recovery
 - Financial assistance
 - Financial incentives
- Restoration of all lifelines and infrastructure as quickly as possible
- Effective and reliable post-disaster communications
- Cooperative recovery efforts by public and private sectors, and the residents
- Restoration of supply chain integrity
- Business continuity planning (BCP) ahead of time



Recommendation

The California Seismic Safety Commission build on this and previous projects by establishing an *ad hoc* subcommittee that will engage a broader group of California companies, representing all sectors of the economy, and seek their contributions to identify policies and strategies that have the potential for speeding post-disaster economic recovery. Japanese companies in California are in a unique position to contribute to this effort.



Implications of Lessons Learned for California

- Be proactive, not reactive
- We know many of the issues that will arise in a post-EQ environment
- Lay the groundwork for post-EQ recovery ahead of time
 - Develop cooperation between public and private sectors
 - Anticipate the issues that are already known
 - Develop and pass appropriate legislations
 - Recovery! Not just reconstruction
 - Motivate the private sector and residents to be part of the solution