The Great East Japan Earthquake

- Our Contributions to the Recovery Effort -

YOKOHAMA RUBBER
CSR REPORT 2012

Up Close 1

Leveraging Our Know-how from the Yokohama Forever Forest Project for a Coastal Levee Project in Otsuchi Town

As an advocate of the "Forest That Protect Lives" project being implemented by Otsuchi Town, located in the Kamihei District of Iwate Prefecture, we will support a project that will serve as a model for future activities.

Supporting strong and beautiful urban development for the future

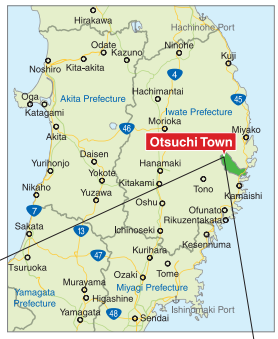
Yokohama Rubber is an advocate of the "Forest That Protect Lives" being implemented by Otsuchi Town as part of the vision in its earthquake recovery plan to" our beautiful town, looking out on the sea, inspiring people to take a walk". As the first step, we will support a tree planting project that will serve as a model for future activities.

A"Forest That Protect Lives" is a concept first created by botanist Dr. Akira Miyawaki, who is currently serving as an advisor to the Yokohama Forever Forest Project. Essentially, trees are planted atop a coastal levee using the Miyawaki method, which involves planting native tree species to create a forest that is as natural as possible. This same method has been used for the Yokohama Forever Forest Project since its inception in 2007. A forest consisting of native tree species that support one another will form a solid forest floor that cannot be uprooted. This will help mitigate damage from tsunami and tidal surges. The lush green forest will also provide a beautiful landscape as well as give a sense of peace and serenity to the people living in the local community.

We hope to utilize the know-how gained from the Yokohama Forever Forest Project for the recovery and revitalization of Otsuchi Town. With this commitment in mind, we will actively implement and support tree planting activities together with members of the local community. On April 30, 2012, we held a tree planting event that included volunteers from the community and Yokohama Rubber.

A tree planting event was held on April 30, 2012 on a mound created onsite at the Otsuchi Water Treatment Center to serve as a model for the actual coastal levee.

Tree planting event attended by many in the local community



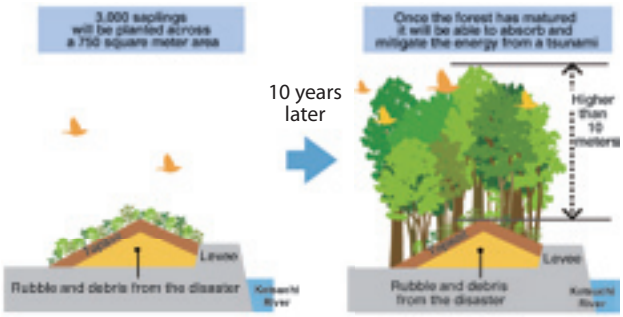
Regional and Local Map of Otsuchi Town

Creating a safer, more secure coastal levee by effectively utilizing rubble and debris from the disaster

A unique feature of the "Forest That Protect Lives" concept is that rubble and debris still remaining from the disaster will be effectively used in the foundation. First, rubble and debris will be sorted and buried in the ground. On top of this a mound will be formed on which trees will be planted. This will create a layer of air between the rubble and soil, which will enable the roots of the newly planted trees to dig deeper into the ground. The tree roots will envelope the rubble, making the forest above stronger and more stable.

Building up the mound will ensure it serves as a safety net against future tsunami, while the act of tree planting will help heighten everyone's awareness toward disaster preparedness.

Coastal Levee Plan



Conventionally, pine trees, which grow quickly and are tolerant of salt water environments, have been the tree of choice for tide-water control forests. However, research conducted on areas affected by the disaster showed that pine trees were weaker in terms of soil retention and more prone to falling. This demonstrated that pine trees would not function effectively in a tide-water control forest in these areas.

Native tree species planted using the Miyawaki method are ideal for creating a strong underground root system that provides stability. This will help mitigate tsunami damage and provide additional time to evacuate. At the same time, the forest will also help prevent people from being swept out to sea when a tsunami recedes.

Yokohama Rubber is committed to supporting this "Forest That Protect Lives" because it will help safeguard the lives of everyone in the local community.

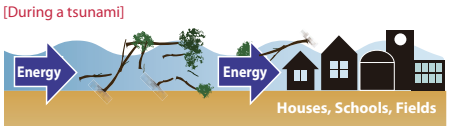
Message to Yokohama Rubber

Dr. Akira Miyawaki
Plant Ecologist

Yokohama Rubber has helped to create valuable forest by planting some 500,000 trees of potential natural vegetation both in Japan and overseas under the aim of coexistence with leading technologies. Using this knowledge, Yokohama Rubber has taken the first-ever approach of creating a forest for mitigating disaster damage and conserving the environment from earthquake rubble and debris in Otsuchi Town, which suffered serious humanitarian and infrastructure damage due to the Great East Japan Earthquake. I am deeply appreciative of Yokohama Rubber Chairman Nagumo and President Noji as well as everyone involved in this project for taking the initiative to create a genuine furusato (hometown) forest that coexists with the local economy, helps safeguard members of the local community and protects the entire community from inevitable disasters, such as earthquakes, tsunami or fires. I look forward to the future development and activities of Yokohama Rubber.

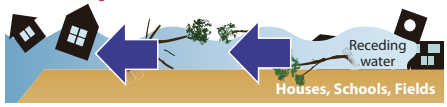
Conventional tide-water control forest (Japanese red and/or black pine)

[During a tsunami]



Pine tree roots reach deep into the ground depending on conditions, but in overly damp sandy areas along the coast pine tree roots extend outward, instead of downward, which weakens their stability. Swept away trees pose a threat to people and buildings.

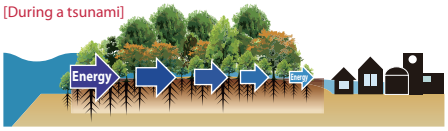
[When receding]



People and property are swept out to sea by receding water

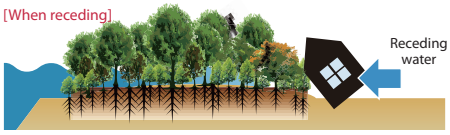
Future tide-water control forest (greenery that safeguards lives and property)

[During a tsunami]



The multilayered forest will act as a wall that will break up a tsunami and mitigate its energy. This will reduce water levels and flow speed, providing people with more time to evacuate.

[When receding]



People and property will not be swept out to sea.

Source: Website of the Tohoku Council for "Forest That Protect Lives"

Message from the Mayor of Otsuchi

Mr. Yutaka Ikarigawa
Mayor
Otsuchi Town, Kamihei District, Iwate Prefecture

The rubble and debris from the tsunami symbolizes a part of the lives and in a sense something left behind by those that lost their lives in this disaster. A forest created atop this rubble and debris stands as a final resting place of souls. In this regard, this initiative will be a reminder of this disaster and that we must prevent future occurrences. Reconstructing a town that has lost everything starts from scratch, and in this sense, this forest created atop the ocean in Otsuchi Town will serve as a "Forest That Protect Lives" that helps the entire community drive the recovery effort forward. I am deeply grateful for the extensive assistance being provided by Yokohama Rubber.

Feedback from a Participant

Taku Sasaki
General manager
Iwate Branch Head
Yokohama Tire Japan Labor Union

The Sanriku area suffered extensive damage from the tsunami and took countless lives. Among these were our daily business partners, suppliers and the family members of employees. Dealing with such loss has been painful for us all. Since then, I have continually thought of how I, as a local from Iwate, can help restore the once scenic beauty of the Sanriku area. I feel proud of the fact that I was able to take the first step toward this goal by planting trees together with the people of Otsuchi Town. Going forward, I will be closely following the progress of this coastal levee.

Helping to mitigate damages caused by a disaster

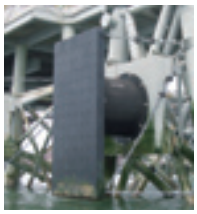
The potential of pneumatic fenders

Capitalizing on its long-standing automotive tire technologies, in 1958 Yokohama Rubber became the first company in the world to manufacture a floating pneumatic fender. Since then, our floating pneumatic fenders have been used around the world alongside berthing vessels and on docks. If a fender is mistakenly damaged, it could lead to environmental degradation from an oil spill or result in the injury or death of dock workers. This is why floating pneumatic fenders have helped improve the safety of boarding at sea and also enhanced efficiency.

Many types of fenders are sold today, including solid (made from thick-walled rubber) and pneumatic types. Yet, our pneumatic fenders have come to be known as Yokohama Fenders thanks to their solid reputation internationally. This reputation has helped our pneumatic fenders capture the leading share in markets around the world.

The advantage in our fenders can be found in the fact that we use the compressive elasticity of air from inside the rubber itself. This means that the recovery force gradually increases and the amount of compression is large. Fenders use this softening force to absorb the energy of vessel movements and from mooring cables when berthed. Based on this, Yokohama Rubber has been researching the potential use of fenders to help mitigate tsunami damage.


Floating pneumatic fender


Fixed pneumatic fender

Message from a Researcher

Shigeki Sakakibara
Dr. of Engineering,
Senior Engineer,
Industrial Products Technical Dept.
Industrial Products Technical Division

I have been engaged exclusively in fender research since joining the company in 1989. Since 2005, I have been working alongside researchers at Kobe University to conduct repeated simulations on pneumatic fenders behave when used on a berthed ship during a tsunami strike.

Our research has shown that compared to solid fenders pneumatic fenders soften the impact on a vessel as well as effectively reduce vessel movement and mitigate the force placed on mooring cables used to secure the vessel in place. Simulations indicated that even when a 2-meter high tsunami strikes the superior spring performance of pneumatic fenders can potentially reduce vessel movements like rolling, especially when used on LNG carriers. Depending on the height of the wave, pneumatic fenders may also help enhance survival mooring capabilities, such as preventing vessels from being swept out to sea. Today, we have are examining ways of how best to respond depending on the height of the tsunami wave. I hope to share just how hard crew members work to safeguard their ship by showing the force that a vessel receives during a tsunami and its movements quantitatively and in an easy to understand manner.

In this regard, I believe my mission is to help reduce damages from disasters. I have always had a strong interest in ships and the ocean, and felt I was very lucky to be able to research both through my work. My commitment to my work has become even stronger after seeing the misery caused by the Great East Japan Earthquake. Going forward, I hope to find even greater possibilities in fenders.

Looking back on the post-quake response for hints about future assistance measures

Roundtable talks led by volunteer participants

We held a roundtable talks on the type of assistance that should be provided to the affected areas and how individuals should get involved with the reconstruction effort. This talk was led by employees that participated in the earthquake recovery effort, including eight from the Yokohama Rubber head office, eight from the Hiratsuka Factory, two from the Onomichi Plant, and seven from the Mie Plant.

Roundtable talks held at each business site saw active debate and received many unique ideas because employees took part as volunteers. Employees volunteered in the recovery effort for a variety of reasons, with more than one individual sharing, "I was hesitant about taking part as an individual, but the company encouraged me to join in and also helped defray the cost," and "I wanted to participate since I had a positive experience volunteering in the wake of the Great Hanshin-Awaji Earthquake." Many of the employee volunteers felt firsthand the tragedy of the earthquake and tsunami, which was much different than watching events unfold on the news. One employee volunteer noted, "You can't really get a sense of the terror caused by this tsunami unless you're actually there at ground zero. There're a lot of things that volunteers can provide, so I felt it was important to get out there and see what I could do to help." Participants provided many unique ideas in terms of how the company can assist. This included potentially selling locally made produce and products at the coop, providing Yokohama Rubber fenders to help restore rafts used by local oyster farmers, and planting trees in a similar fashion as the Yokohama Forever Forest Project, among others.

Roundtable talk participants also shared some of the problems that took place as well. These included the fact that solicitations for volunteers did not reach certain employees, that volunteering is not firmly rooted in the company's culture, and that no leave was provided to new hires to take part in volunteer activities. We plan to examine each of these issues and make improvements going forward.



Roundtable talks in which employees participated as volunteers

In response to the roundtable talks

For Yokohama Rubber, 2011 was a year in which it began dispatching employee volunteers to the disaster-affected area and initiated corporate volunteer work. These initiatives helped raise awareness within the company, sprouting a culture where each organization proactively dispatches employee volunteers, and we hope to capitalize on this momentum going forward. Between March 2011 and March 2012 a total of 125 employees volunteered in the Kesennuma Oshima, Higashi Matsushima and Onagawa areas. Activities in Kesennuma Oshima organized by Global Compact Japan Network, which accounted for about one-quarter of all Yokohama Rubber employee volunteers, involved the cleanup of rubble and debris.

Through these roundtable talks, we were moved by our employees' awareness and passion to help. This included their awareness that something needed to be done, even by individual people, in the face of unprecedented damages and the fact that some employees had already been involved in volunteer activities prior to the disaster. The volunteer work of our employees was nothing short of amazing.

Yokohama Rubber became a signatory to the United Nations Global Compact in 2012.

As part of this, we launched a cross-divisional workshop that oversees not only volunteer activities, but all of our philanthropic activities as well. Through this workshop, we have also started revising and reviewing our definition of corporate volunteering as well as related programs. The workshop also consists of members that have experience volunteering. Going forward, we will continue to actively take part in aid activities, while clarifying the purpose of pursuing these activities as a corporate entity.

Atsushi Kanazawa
General Manager,
CSR & Environmental Affairs Dept.

Innovations made and matters to review following our earthquake reconstruction assistance programs

Innovations made	We fostered an environment that encourages employees to participate by sharing specific volunteer activity program details such as dates, how to get there and accommodations. We decided to fund the cost of transportation to the affected area and local accommodations for employees participating in volunteer activities that assist the Great East Japan Earthquake reconstruction effort.
Matters to review	• Employees with less service time at the company are not granted leave for taking part in volunteer activities, making their participation difficult. • Activities for which the company encourages employees to volunteer in should be made more widely known. • The company needs to be aware of safety issues regarding the volunteer activities that it encourages employees to take part in (from a Mie Plant employee that helped deliver relief supplies to Onagawa Town on March 19, a little over one week after the earthquake).

Held tsunami evacuation drills
(at two manufacturing sites and 23 offices)

Yokohama Rubber held tsunami evacuation drills at business sites located inside an either an area where measures against a Tokai earthquake are to be intensified or an area requiring disaster preparedness measures for a Tonankai or Nankai earthquake. These sites are believed to be at risk of damage based on their position on the tsunami hazard map. Onsite disaster handling divisions communicated with Central Disaster Response Headquarters at the head office using three separate modes, including satellite phone, internal line using an IP mobile phone, and public pay phones located inside plants. This training exercise enabled us to confirm the space and time needed to complete evacuations as well as the distance of the evacuation site to each respective business site. As there were several changes we needed to make concerning the response of each business site, we plan to hold a second tsunami evacuation drill sometime after September 2012.

Details of the tsunami evacuation drills

1. Date of drills: Thursday, November 24, 2011
   10:00 am Major earthquakes strike in the Tokai, Tonankai and Nankai areas (scenario)
   10:05 am The Japan Meteorological Agency issues an advisory for a large tsunami advisory (scenario)
2. Purpose: (1) To make the evacuation site and route known to employees in the case an advisory for a large tsunami is used and to practice using this route
   (2) To confirm the communication system for contacting the Central Disaster Handling Division from the evacuation site

Production sites: Mie Plant and Onomichi Plant
Sales offices: 2 YMJ offices, 12 YTJ offices, 9 directly-owned tire distributors

Mie Plant employees help assist Kiho Town after it was damaged by Typhoon Talas

Mie Plant employees, who were among the first to collect relief supplies such as food and daily essentials for the victims of the Great East Japan Earthquake, also actively participated in volunteer activities in Kiho Town, located in the Minamimuro District of Mie Prefecture, after it suffered damage from Typhoon Talas. This is because as a contributing member of the local community the Mie Plant wanted to quickly help out those in need.

Typhoon Talas brought record-breaking rainfall to the Kii Peninsula, which caused damage in Mie, Wakayama and Nara prefectures, in particular. Kiho Town, which is located along the lower reach of the Kumano River, suffered serious damages from flooding and landslides as a result.

The 23 employees that volunteered their time helped to cleanup homes that had been inundated with flood waters, carryout furniture from these homes as well as help remove rubble and debris. The Mie Plant employed a workforce of 1,120 as of December 2011. The plant is known for its high level of team work in the local community where it often takes part in cleanup activities along the Futami Coast, around the plant, and on local rivers. Based on this experience, the plant voluntary takes part in relief aid whenever a disaster strikes. The plant's call for one-coin donations to benefit the Tohoku region continues today.