Holcimawards
for sustainable construction

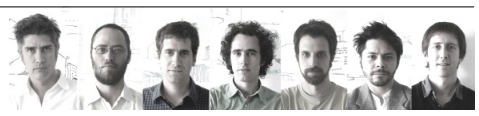
Regional Holcim Awards competition 2011

Silver Award Latin America

Sustainable post-tsunami reconstruction master plan, Constitución, Chile

Project data

Project group	Landscape, urban design and infrastructure projects
Client	Chile Government
Project background	Public commission
Estimated start of construction	January 2012



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Comment of the Holcim Awards jury Latin America

The jury values the thoughtful approach of proposing a long-term strategy of upgrading the built environment rather than implementing an ad hoc action plan to reconstruct that which had been destroyed by the tsunami and earthquake. Furthermore, the project's effective establishment in the social community through citizen participation was recognized, demonstrating the contextual and social sensitivity of the master plan.

Project description by author

The Plan for Sustainable Reconstruction (PRES) of Constitución was developed after the 8.8 earthquake/tsunami of February 27th, 2010. We were given 90 days to produce all the necessary studies and documents capable of coordinating the action of both public and private entities in the reconstruction of infrastructure, public spaces and services, housing, energy and economic activities of the city. The *8.8 Earthquake Chile – sustainable reconstruction master plan* was done with the intense participation of the entire community.

Chile did well against the earthquake: building codes are appropriate and respected by the people. But the challenge was that our cities proved not to be prepared against tsunamis. There were three factors that different stakeholders wanted to implement for the reconstruction:

1) forbid settlements in the areas devastated by the waves, which was unrealistic since informal occupation would have been very hard to prevent
2) "do nothing", allowing people to go back to where they were, as they were, which would have been irresponsible, and
3) build massive infrastructures to protect the city, for which there was enough evidence that proved it would be useless because a tsunami is not just a heavy swell.

We offered a fourth path which was threefold:

1) no longer try to resist the waves, but dissipate their energy trough friction. Against geographical threats, geographical answers: we proposed a forest able to mitigate the impact of a tsunami. If the trees had the right density, diameter and resistance to horizontal loads, we might reduce the wave's energy by 40%. (Empirical proof, was the island in front of the city, that not only reduced the force of the waves, but also served as a vertical escape route, that saved many).
2) we recommended conditioned construction right after the mitigation forest, with no residence and pier-like structures in the lower floors.
3) finally, an efficient evacuation plan to higher areas was designed. The combination of these three strategies allowed for a reconstruction of the city as close as possible to where it has historically been, in proximity to the sea and the river that actually are the base of its existence.

But a tragedy is always an opportunity too: the park opened the city towards the river, providing democratic public access to what the community identified as their real identity (previously owned only by a few private landlords), repairing the "historic debt" of green urban areas. With this new anti-tsunami urban DNA plus an updated urban standard for the whole city, each of the buildings, streets, squares and houses (following the Elemental principles that we have developed over the years on incremental housing) to be reconstructed, could be developed on substantiated physical and conceptual urban foundations.

Relevance to target issues by author

Innovation and transferability – Progress

Chile faced a new challenge after 27F: to design cities with an anti-tsunami urban DNA. Scarce resources made heavy infrastructure unfeasible. So we thought that our privileged ecology might provide a solution: trees can grow and become resistant in 20 years. To mitigate a tsunami we propose a forest not walls. Actually the knowledge developed by the forest industry, a major development agent in the zone, was transferred to urban design. Against geographical threats, geographical responses.

Ethical standards and social equity – People

The PRES plan is validated by an active community participation in the process. The main key of it is an inductive process based on the intervention of citizens facing real projects instead of creating an abstract diagnosis of the situation. We use our professional intuition to propose and test the proposals in the hybrid forums of community, politicians, technical, services and public entities. The participation was transparent, not deferred nor segmented, multichannel, multi-scale and binding.

Environmental quality and resource efficiency – Planet

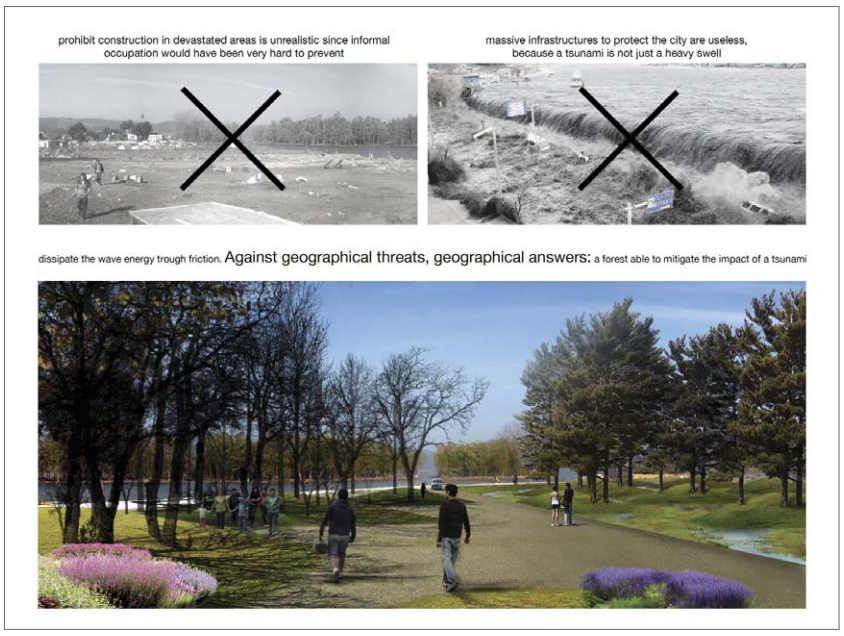
In this region, there was the ecology and the knowledge to grow a forest as an urban protection against tsunami. But the introduction of this mitigation also responded to an existing demand of the community due to flooding from rains that were occurring every year. So we are designing it also as a retardant lagoon and lamination gap to mitigate tidal impact on rising floodwaters. Finally, this project upgrades obsolete urban standards from 2.2m² of green space/person to 6.6m².

Economic performance and compatibility – Prosperity

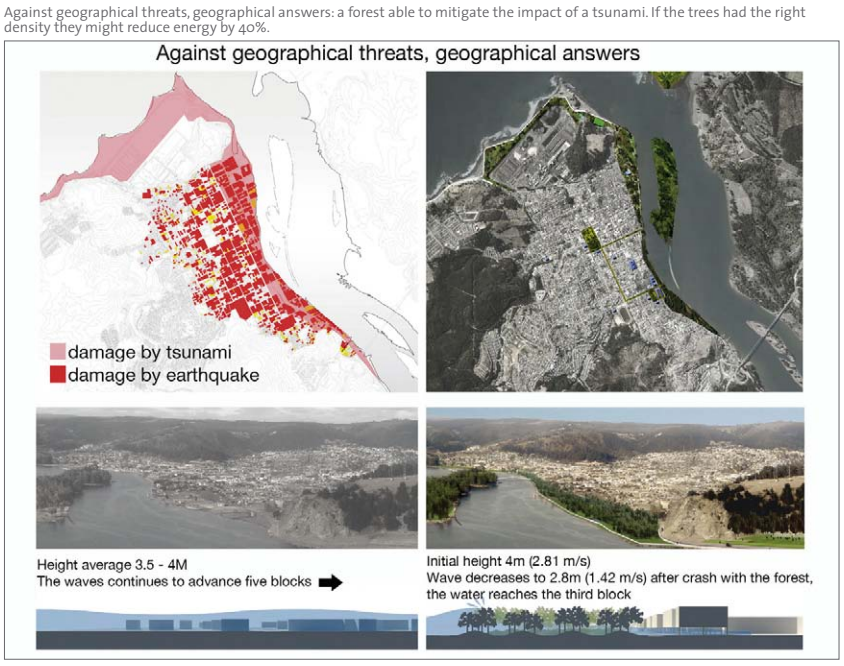
Given that public money was going to be scarce, one of the five courses of action considered was economic reactivation of the city so that people themselves could begin to add to the reconstruction efforts. Our scarcest resource though was not money, but time. So, to buy time, we developed adequate emergency shelters. And knowing that speed and quality tend to be incompatible, we applied the incremental approach of our housing projects to the entire city.

Contextual and aesthetic impact – Proficiency

The plan includes the local production of wooden manufactured materials. The aesthetic approach goes directly on the hand of local productive development. So there are no arbitrary decisions of design. The community itself is endorsing the reconstruction of its buildings.



Against geographical threats, geographical answers: a forest able to mitigate the impact of a tsunami. If the trees had the right density they might reduce energy by 40%.



Damage after earthquake-tsunami, and PRES mitigation park solution.

New green urban areas.

Park opens the city to the river.

Reconstructed foreshores.

Forest mitigates tsunami impact.

Conditioned construction area.

Reconstruction of public space.

Reconstruction of housing.

Active citizen participation.