（別紙１）

論文の内容の要旨

Analysis of Spatial Distribution of Human Network for Resilient Reconstruction of Disaster Area
被災地域の復元力ある復興のための人的ネットワークの空間配置に関する分析

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Motivated by the post-disaster condition configured by the Great East Earthquake of 2011 in Japan, this research was based on the creation of a method, named Map of Memories, that focused at the existent gap over restoring the relational ties strength between local families, displaced or not, of a community affected by a disaster, based on social network survey interconnected to a spatial comprehension. The proposed method towards social resilience based on bottom-up field survey of human relationships in a community and the associated spatial understanding. The expected output was the assessment of housing relocation scenarios to guide social reconstruction based on spatial comprehension. The proposed method was supported by the comprehension of four defined groups of knowledge:
a) social resilience;
b) sustainability;
c) management of project;
d) maps and memories.
It was considered a case study for validation and interpretation to define the limitations and possible unfoldings of this research.

The workflow of the proposed Map of Memories method was structured in eight phases to get accomplished in order to provide all necessary outputs useful to guide the arrangement for housing relocation of a disaster area, as it follows:
1) method initiation, assessment of families displacement, gathering of material and built community trust, based on on-site data collection to support the next phases of the method, such as pre and post-disaster pictures, maps, personal records, conversation, etc.;
2) planning of the family dynamic as an off-site activity to prepare the map, texts and all support material to be used at the family dynamic activity;
3) application of family dynamic as an on-site survey to extract the pre-disaster the community pre-disaster condition identifying significant gathering nodes, asking residents to pin physical small flags in a printed map fixed in a soft board;
4) family dynamic outputs as an off-site activity, using computer programs for data processing of collected information to be used as a database to build the questionnaires;

5) application of housing relocation scenarios questionnaire and individual social network questionnaire, based on on-site interview with families to survey of displaced and not displaced families of the community;
6) processing of data and outputs, using computer programs as an off-site activity to construct basis of expectation of local community about housing relocation scenarios and the construction of social network overlapped to the local map and the disaster aftermaths based on displacements of families;
7) data analysis and interpretation based on outputs as an off-site activity, making comparison of pre and post disaster changes on the strength of individual and group social network, analyzing spatial disruptions between the families;
8) off-site activity using computer programs to define the best arrangement of relocation as a guide, based on simulations of allocation of displaced families at each proposed relocation scenario at the questionnaire and assess, using the score system, the best situation that present best recovery of families connectivity based on calculation and comparison of proposed simulation of scenarios considering distances of families at the housing relocation compared to the pre-disaster social network as a reference of maximum score.

The eight phases of the Map of Memories workflow was applies in Shibitachi village, one of the many affected areas by the Great East Earthquake in Japan, worked as a validation of this proposed method and was a stage from what it was possible to build a final revised method flow, located at the annex of the thesis body, as well to identify the limitations of the process accomplishment of the proposed method in this research. By its application it was possible to identify that it seems to work well in small rural communities, yet not tried on bigger or urban communities. However, the Map of Memories still does not give accurate criteria at distribution of families in the simulation of relocation scenarios, in what it was considered to keep, at least a spatial re-connectivity of one of relational tied family. It is still needed to improve the speed of on-site data collecting and off-site processing and analysis. The calculation system still needs improvements based on social network graph analysis but it already indicates the effectiveness of each relocation scenario and it is still possible to use more appropriated computer programs to process data and get better outputs.

From this Map of Memories method it is possible to survey part of the community families and receives back the coverage of wider number of connected mentioned families, based on social network, considering reciprocity of relationship. This method is able to support more assertive decisions of investments allocation for housing relocation projects in post disaster reconstruction plans based on community bottom-up approach as a catalyst of end users satisfaction over their expectations for the future od the community.