

SUMMARY OF MASTER'S DISSERTATION

Student Identification Number	81033583	Name	Atsushi Yoshinaga
<p>Title</p> <p style="text-align: center;">Multi-Agent Modeling of Residential Redevelopment for a Crowded Region of Wooden Dwellings</p>			
<p>Abstract</p> <p>Japanese society needs to turn into a low-carbon society with sustainable energy use by redeveloping of existing cities because of environmental issues and issues encountered after the earthquake in March 2011 and those accidents of Atomic power generator.</p> <p>This paper is discussing the redevelopment regarding “Crowded Region of Wooden Dwellings” which consists mainly of narrow and old wooden dwellings of 65m² area and making Agent Based Model for this region in order to suggest a policy for redevelopment of those areas. Actual data used in the simulator and making analysis are from south Kouen-ji and south Asagaya in Suginami-ku, which is an example of “Crowded Region of Wooden Dwellings.” Due to overpopulation and degradation of those dwellings, those areas are considered dangerous areas in Tokyo. This research consists of V-Model from Systems Engineering, which includes requirement analysis, decomposition of problem, root causes analysis, building model, verification of model, evaluation of scenario, and validation of suggestion.</p> <p>After interviewing to a ward office of Suginami-ku and decomposing problem of those areas, the root cause of which was found to be complications of rebuilding, this paper focuses on the solution of rebuilding.</p> <p>According to those analyses, we found two main factors - condition of the inhabitants and condition of their dwellings, regarding the behavior of inhabitants for rebuilding. A model and a simulation are developed using those two factors. The output from the simulation model during 2001 to 2011 is checked against real data as one of the verification for this model of simulation.</p> <p>This simulation shows that those areas in simulation model take 23years to reach the 70% of fireproofed areas and that result of simulation differs from usual scenario in that the moving rate for elderly is variable and narrow houses possible to rebuild. Also, a scenario, which is combined two changes, shows dramatic acceleration in the rebuilding rate.</p> <p>Creating policy alternative for those areas is based on simulation result, and two alternatives are selected based on countermeasure for fire, which is applied now. After those qualitative evaluations, this paper calculate the rate of rebuilding and saving energy and then estimate the rebuilding cost in case of the disaster in those areas.</p> <p>Suggestions for those areas are two in this paper. First one is for accelerating moving rate of elderly more than 5%, second one is making the narrow house possible to rebuild. This simulation model shows three expectations as the effect of those two actions in 30 years. Reduction of the damage rate of house is between 11% and 22%, decreasing the cost for rebuilding in case of disaster by 10% to 24% and energy consumption by 31% to 38%.</p>			
<p>Key Words (5 words)</p> <p>Crowded Region of Wooden Dwellings, Multi-Agent Modeling, Redevelopment, Quantitative Analysis, Counter measure of Fire</p>			