Appendix 1. Structural, Non-Structural and Organizational approaches in pre-disaster phase and Organizational approaches during the earthquake

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| **Pre-disaster** | | |
| Structural approaches in pre-disaster phase | Studied Universities | Notes |
| Evaluation of structural vulnerability against earthquake | University of California, Berkeley (UCB, 2000),  Stamford University (SU, 2004),  University of South Florida, Tampa Campus (USF2, 2014). | Building evaluation in primary and secondary Phases using the FEMA 154 Plan |
| Evaluation of lifeline vulnerability | University of California, Berkeley (UCB, 2000) | Determination of the specifications of lifeline networks of the universities and identification of their vulnerable points |
| **Non-structural approaches in pre-disaster phase** | **Studied universities** | **Notes** |
| Seismic Reinforcement Manual for non-structural compartments regarding facade, interior design, all of the mechanical and electrical facilities, and building pipelines | University of California, Berkeley (UCB, 2000),  University of Washington (UWT, 2005) | Effects relating to movement, such as sliding and overturning, and also effects relating to the destruction of non-structural elements like doors, windows, walls and false ceilings |
| **Organizational approaches in pre-disaster phase** | **Studied universities** | **Notes** |
| Task determination for students, professors, staff and faculty heads during earthquake | University of California, Berkeley (UCB, 2000),  University of Winnipeg (UW, 2005),  University of Wisconsin-Milwaukee (UWM, 2004),  Mercer University (MU, 2004),  University of Guelph (UG, 2002),  University of Queensland (UQ, 2000),  Simon Fraser University (SFU, 2004),  University of Florida (UFL, 2005),  Francis Marion University (FMU, 2005),  Seattle Pacific University (SPU, 2005),  University of San Diego (US, 2000),  Samford University (SU, 2004),  Roger Williams University (RWU, 2005),  Southern Methodist University (SMU, 2002),  Ohio State University (OSU, 2002),  University of Utah (UU, 2004),  [West Carolina University](http://rds.yahoo.com/_ylt=A0oG7lRsf8ZMLgUB_HyQorh_;_ylu=X3oDMTBxYmxvbGc3BHNlYwNzcHIEY29sbwNlBHZ0aWQDBHBvcwM0/SIG=1cm23deq6/EXP=1288163564/**http%3a/280966.r.msn.com/%3fld=4vr4_rlU0CcaG9ZjKhBsxp5Kb_OVVSEa8aenvKY3hvVu2rLYyUUkMIbDDWfUHUYcV8ib7J4RUHCfbexdVEn3FeoRx5LReyX0AXONWDwzxlusW7b5Rq-1VMxkgV8CMN_yXRXod-DS2JZMeMp_R1sG7SgYNwNWzc4apT5wU4Lt4smwvrirSSSwCWozOKlhCh_HxALyeVyuIP0FtaRGC5ZYMK4F1rtlGGQe3KKR_LRLj7vdf_BcSjw4Ae8TaMspnVGtAw3FZEf0-pHXUsmJbB2Y29cTVUCUyb1KkmYSp1f4XQCNfa7wbFECZjcz1qc1pvdt78mUDvH97heE3TtMwF5ZcCRgYhPXXkqt46qg) (WCU, 2003) and  University of California Santa Barbara County (UCSB, 2016),  University of South Florida, Tampa Campus (USF2, 2014),  University of Cambridge (UC, 2015),  Boston University (BU, 2014). | Staff Training through short-term courses or official training programs |
| Introducing the management plans to the newly employed staff before they start working | Ohio State University (OSU, 2002) | In evacuation and emergency operation plans, training the new staff before they start working and during other activities has been considered |
| Training during work | University of Washington (UWT, 2005),  University of South Florida, Tampa Campus (USF2, 2014),  Boston University (BU, 2014). | Providing training classes, sending the training documents via email |
| University of Organ (UO, 2008) | Providing training classes at the beginning of each term, CD, Book and Bulletin |
| Informing of the maneuvers held in the university | University of Washington(UWT, 2005) | Maneuvers regarding evacuation and temporary housing, or including the entire risk management cycle |
| Ohio State University (OSU, 2002),  University of Washington (UWT, 2005),  Southern Methodist University (SMU, 2002),  University of Guelph (UG, 2002),  Francis Marion University (FMU, 2005),  Mercer University (MU, 2004) and  University of Winnipeg (UW, 2005) | 2-4 maneuvers yearly |
| Cost-Benefit Evaluations | Federal Emergency Management Report (FEMA, 2003) | The following items should be considered:   1. Probability of earthquake occurrence 2. The time spent on risk reduction measures 3. Inflation rate and value of money varying with time |
| Preventing neglect to the risk management plans of the university | (FEMA, 2003) | The importance of the risk management plans of the university reduces gradually(FEMA, 2003) |
| Advice on installing alarm systems and exit signs in university | (FEMA, 2003) | In emergency conditions, people should be able to follow the instructions on the signs without wasting time and exit the building immediately(FEMA, 2003) |
| Advice on installing safety facilities in university buildings | (FEMA, 2003) | Installing fire extinguishers in the building and automatic extinguishers in each floor, automatic valves for disconnecting gas pipes, automatic return of elevators to ground floor |
| Activities regarding confirmation, acceptance and employing the plans in the university | (FEMA, 2003) | Plan acceptance is a short and simple process, however, employing it is a long process and needs appropriate revision, cooperation and completion for it to reduce the level of vulnerability of the university against disasters(FEMA, 2003) |
| **During the earthquake** | | |
| **Organizational approaches during the earthquake** | **Studied Universities** | **Notes** |
| Providing the appropriate risk management plan in the university | University of California Santa Barbara County (UCSB, 2016),  University of Utah (UU, 2004),  Southern Methodist University (SMU, 2002),  Samford University (SU, 2004),  Seattle Pacific University (SPU, 2005),  Simon Fraser University( SFU, 2004),  Francis Marion University  University of (FMU, 2005), Florida (UF, 2005),  University of Queensland (UQ, 2000),  University of Guelph (UG, 2002),  Mercer University (MU, 2004),  University of Wisconsin-Milwaukee  (UWM, 2004) and  University of Winnipeg (UW, 2005),  University of South Florida, Tampa Campus (USF2, 2014),  University of Cambridge (UC, 2015). | The president of the university or in his/her absence, the vice president or the most superior police officer of the university is responsible for announcing the emergency conditions |
| Proposing a method for appropriate communication during the disaster | Ohio State University(OSU, 2002),  Francis Marion University(FMU, 2005) and  University of Utah (UU, 2004) | Informing the students, staff and the researchers simultaneously with the response operation |
| Southern Methodist University(SMU, 2002),  University of Wisconsin-Milwaukee(UWM, 2004),  Samford University(SU, 2004),  University of Guelph(UG, 2002),  Ohio State University(OSU, 2002) and  Francis Marion University(FMU, 2005) | Phone is the first option for contacting in emergency conditions and considering the outage of power during the earthquake, the phones should not be dependent on electric power |
| Southern Methodist University (SMU, 2002),  Mercer University (MU, 2004),  University of Winnipeg (UW, 2005),  University of Wisconsin-Milwaukee (UWM, 2004) and  Samford University (SU, 2004) | In case the phone lines are disconnected due to the earthquake, normal cell phones, satellite cell phones, pagers, voice mail, email and walkie-talkies can be used instead |
|  | University of Guelph (UG, 2002) and  Mercer University (MU, 2004) | In case all other communication systems fail, the wireless communication systems of police, or anything similar available in the university can be used instead |
| University of Washington (UWT, 2005) | Creating a group called “The emergency communication network team” |
| University of Washington (UWT, 2005) | University website should be updated every 5 minutes in emergency conditions. It is considered one of the most important communication systems along with phone lines and wireless systems |
| Francis Marion University (FMU, 2005),  University of Florida (UFL, 2005) and  Samford University (SU, 2004) | University police are responsible for the communication of different university units during the disaster |
| Advice on evacuation routes and emergency evacuation sites for each building of the university | Simon Fraser University (SFU, 2004),  University of South Florida (USF2, 2014). | In these plans, in addition to the evacuation routes and emergency evacuation sites, the people responsible for the evacuation process are specified, and some information regarding training and exercise is provided |
| Advice on dealing with the disabled | Ohio State University (OSU, 2002) | Disabled people have 4 options:   * Horizontal evacuation, * Evacuation from stairs, * Staying in the place * Going to a safe evacuation site |
| Paying attention to the mental and psychological needs of the people involved in the risk management plan | Grand Valley State University (GVSU, 2010) | The following practices can be employed by the university authorities to reduce the mental harm of the students:   * Considering stress management plans * Considering counseling services * Cooperation and coordination with other sections * Training the ICS members on stress management * Considering a place for counseling the individuals during the disaster |
| Determining the appropriate mechanism for reformation and revision of the risk management plan of the university | Mercer University(MU, 2004),  University of Guelph (UG, 2002) and  Ohio State University (OSU, 2002). |  |
| Mercer University(MU, 2004) | The best time for reforming and improving the risk management plan is after the end of the operations |