

## Conceptual Methods of Mitigating Matured Urban Tree Roots Surviving in Conflicts Growth within Built Environment: A Review

**Authors :** Mohd Suhaizan Shamsuddin

**Abstract :** Urbanization exacerbates the environment quality and pressures of matured urban trees' growth and development in changing environment. The growth of struggled matured urban tree-roots by spreading within the existences of infrastructures, resulting in large damage to the structured and declined growth. Many physiological growths declined or damages by the present and installations of infrastructures within and nearby root zone. Afford to remain both matured urban tree and infrastructures as a service provider causes damage and death, respectively. Inasmuch, spending more expenditure on fixing both or removing matured urban trees as risky to the future environment as the mitigation methods to reduce the problems are unconcerned. This paper aims to explain mitigation method practices of reducing the encountered problems of matured urban tree-roots settling and infrastructures while modified urban soil to sustain at an optimum level. Three categories capturing encountered conflicts growth of matured urban tree-roots growth within and nearby infrastructures by mitigating the problems of limited soil spaces, poor soil structures and soil space barrier installations and maintenance. The limited soil space encountered many conflicts and identified six methods that mitigate the survival tree-roots, such as soil volume/mounding, soil replacement/amendment for the radial trench, soil spacing-root bridge, root tunneling, walkway/pavement rising/diverted, and suspended pavement. The limited soil spaces are mitigation affords of inadequate soil-roots and spreading root settling and modification of construction soil media since the barrier existed and installed in root trails or zones. This is the reason for enabling tree-roots spreading and finds adequate sources (nutrients, water uptake and oxygen), spaces and functioning to stability stand of root anchorage since the matured tree grows larger. The poor soil structures were identified as three methods to mitigate soil materials' problems, and fewer soil voids comprise skeletal soil, structural soil, and soil cell. Mitigation of poor soil structure is altering the existing and introducing new structures by modifying the quantities and materials ratio allowing more voids beneath for roots spreading by considering the above structure of foot and vehicle traffics functioning or load-bearing. The soil space barrier installations and maintenance recognized to sustain both infrastructures and tree-roots grown in limited spaces and its benefits, the root barrier installations and root pruning are recommended. In conclusion, these recommended methods attempt to mitigate the present problems encountered at a particular place and problems among tree-roots and infrastructures exist. The combined method is the best way to alleviates the conflicts since the recognized conflicts are between tree-roots and man-made while the urban soil is modified. These presenting methods are most considered to sustain the matured urban trees' lifespan growth in the urban environment.

**Keywords :** urban tree-roots, limited soil spaces, poor soil structures, soil space barrier and maintenance

**Conference Title :** ICUFT 2021 : International Conference on Urban Forests and Trees

**Conference Location :** Kuala Lumpur, Malaysia

**Conference Dates :** August 23-24, 2021