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CONTENTS

Abstract. Arborists commonly use sounding during an initial evaluation of urban trees to determine the presence of advanced decay and hollows. Striking the trunk with a mallet produces stress waves that propagate through the wood and, in turn, generate characteristic audible sounds. Successful application of this procedure, however, requires subjective evaluation of the sonic variations that result from different wood species and densities, and various ambient noise conditions. Therefore, a statistical classification approach was developed for automatically identifying decay from stress waves captured using an accelerometer probe that is less subjective and more reproducible than an operator-in-the-loop approach. The classification algorithms were designed to detect the presence of decay from aberrant characteristics of the vibration waveform and do not rely on sonic velocity changes commonly used in most sonic testing for decay. The approach was tested in a preliminary study on 36 segmented trunk samples representing a wide range of typical urban tree species and decay types. The classifier successfully identified the decay status of 83% of the samples independent of species and trunk diameter. The results of this feasibility study cannot be transferred to real world tree inspection without additional testing on standing trees, but do demonstrate the potential of using accelerometers supplemented with a statistical classifier to support an initial assessment of decay in urban trees by an arborist.
Key Words. Accelerometer; Decay Detection; Feature Extraction; Pattern Classification; Sounding; Stress Waves; Urban Trees; Vibration Waves Wood Decay.

Abstract. Urban trees and forests have distinct benefits and costs that can be evaluated financially. While there are appraisal methods commonly used to value individual trees and urban forests, one method that is difficult to use in practice is a discounted cash flow (DCF) analysis. This is the appraisal method that best accounts for the time value of money and allows for a temporal comparison of benefits and costs. Current timber appraisal methods are discussed for urban situations and DCF analysis is presented as a viable supplemental appraisal method for valuation of the urban trees. Simple models are presented that allow for the solution of DCF-type urban forestry valuations using conventional software valuation packages. Examples are provided of typical urban tree benefit and cost scenarios, with DCF calculations of present value (PV) and net present value using the specialized DCF formulas.
Key Words. Appraisal; Discount Rate; Discounted Cash Flow Analysis; Financial; Net Present Value; Present Value; Urban Forestry; Valuation.

Abstract. The Auburn University campus in Auburn, Alabama, U.S., was used as the site for a case study on the applicability of i-Tree Eco using a 100% tree inventory. The 2009-2010 inventory of the managed areas of campus encompassed 238 ha. Information collected from each tree included diameter at breast height (DBH), tree height, crown width, percent dieback, and a tree condition rating. The complete inventory included 7,345 trees with *Lagerstroemia* spp. (crapemyrtle), *Quercus phellos* (willow oak), and *Pinus taeda* (loblolly pine) being the most numerous species on campus. Average DBH and total height of all trees were 16.4 cm and 8.5 m, respectively, with an estimated canopy cover of approximately 16%. Two tree condition ratings were recorded for each tree and results indicated that percent dieback alone is not a sufficient measure to evaluate tree condition. In this case study, i-Tree Eco procedures were found to be an effective and efficient tool, and provided valuable information regarding Auburn University's urban forest structure and function.
Key Words. i-Tree Eco; Tree Inventory; UFORE Model; Urban Forest Sampling, Urban Forestry.

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Abstract. Trees and saplings were felled and killed by rockslides and soil slides formed during the record breaking rains of May 1–2, 2010, in Radnor Lake State Natural Area, Nashville, Tennessee, U.S. The losses were analyzed by species; stem basal area; root plate diameter and depth; percent slope; occurrence in a rockslide or soil slide as well as species classification as a lateral root system species versus tap or heart root system species. The number of stems lost for each species had a distribution similar to the results of the 2009 Natural Area survey but the number of saplings was significantly underrepresented at the landslide sites. Tree deaths were nearly five times greater than saplings lost. Although there were nearly equal numbers of tree and sapling stems classified as possessing a lateral root system versus tap or heart root system, 74% of the sapling losses were from surface root system species. The means for root plate diameter and depth were significantly larger in rockslides than soil slides even though the mean stem basal area did not differ significantly. For both slide types, slope steepness was not correlated with root plate depth, root plate diameter, or stem basal area. Similarly for both root system classi-fications, slope steepness was not significantly correlated except for surface root system trees with root plate depth. Planting tap root system trees reduces the risk of landslide, but advances in the cultivation of taxa, such as hickory (*Carya* spp.), are needed to assure tap root preservation during transplantation.
Key Words. Rockslide; Root Plate; Root System; Soil Slide; Torrential Rain; Urban Trees.

Abstract. A tree stabilization system (TSS) is specified to promote stability and maintain tree posture at transplant. However, staking and guying can compromise tree health. The authors of the current study have investigated the effects of such stabilization systems on trees to inform urban forest planting specifications. Visual symptoms for tree health were recorded for 488 trees with and without TSSs in Guelph, Ontario, Canada. Results showing symptoms of stunted growth, death, and pest/disease were fewer on trees observed with TSSs. Health was negatively impacted by TSSs by producing more symptoms of girdled trunks, swelling, and wilting. Trees planted on public land were found to benefit from being stabilized while trees on private land expressed more negative health effects when observed with trunk support. Implications for urban forest professionals include limiting tree stabilization practice to site conditions where their use is warranted along with timely removal.
Key Words. Guying; Staking; Transplant; Trunk Support; Urban Forest.

Abstract. Tree planting programs in Malaysia have progressed as planned. However, the subsequent management of the street trees, particularly at Kuala Lumpur City Hall, is not well undertaken due to inadequate information for management and maintenance purposes. There has never been a systematic tree survey conducted to inventory street trees in Kuala Lumpur. With this, a survey was conducted to collect comprehensive information on tree structure, species composition, species diversity, and tree defects and disorders. A total 2,191 street trees were surveyed.
Key Words. Hazard Tree Management; Species Diversity; Tropics; Urban Trees; Urban Forest Management.

Abstract. This paper presents a rapid assessment method to estimate urban tree debris following an ice storm. Data were collected from 60 communities to quantify tree debris volumes, mostly from public rights-of-way, following ice storms based on community infrastructure, weather parameters, and urban forest structure. Ice thickness, area of a community, and street distance are significant predictors for estimating debris from ice storms. Results from this study provide a way to estimate woody debris volumes from urban trees immediately following an ice storm. The model can also be used to predict debris volumes for storm preparedness planning.
Key Words. Emergency Management; Ice Storm; Storm Damage; Tree Debris; Urban Forest.

Abstract. Establishing the effects of planting depth on tree stability and growth is critical in understanding the role nursery production plays in planting depth issues at the landscape level. In this study, bare root Whitespire birch (*Betula platyphylla* var. *japonica* 'Whitespire'), green ash (*Fraxinus pennsylvanica*), Snowdrift crabapple (*Malus* × 'Snowdrift'), and bicolor oak (*Quercus bicolor*) were grown for 17 weeks in a container production setting with four levels of substrate over the first main-order root: 0, 5, 10, and 15 cm. Birch demonstrated the greatest instability of all species, leaning significantly more when planted at 0 cm than at 15 cm. In ash and crabapple, there were no significant differences in either the number of trees leaning or the amount of lean in all treatments throughout the study. Oak stems bent excessively, invalidating lean measurements. Stem caliper increase was significantly greater in ash planted 0 and 5 cm deep than 10 and 15 cm deep. There was no significant difference in stem caliper increase between planting depths in other species. Birch planted 0 and 5 cm deep had greater root volume increase than those planted 10 and 15 cm deep. Root volume increase in ash, crabapple, and oak did not differ significantly between treatments. Infrequent windthrow events were observed, but appeared random and apparently unrelated to planting depth. The perceived benefit of planting trees deep in containers to improve stability was observed in only one species (birch) at one depth (15 cm) and was at the expense of significantly reduced root volume increase.

Key Words. *Betula platyphylla* var. *japonica* 'Whitespire'; *Fraxinus pennsylvanica*; *Malus* × 'Snowdrift'; *Quercus bicolor*; Stem-encircling Root; Stem-girdling Root.