PARTICIPATORY PLANNING OF A URBAN TREE-LINED: THE CASE OF STUDY OF CALCINAIA (PISA)

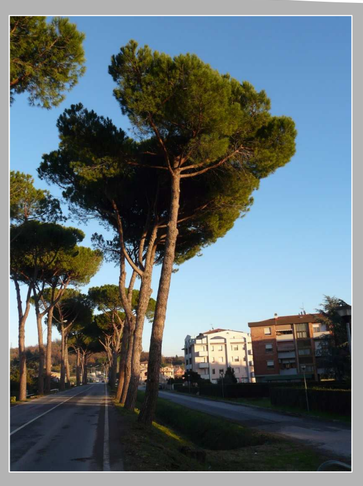


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Calcinaia is a small town in the province of Pisa (Tuscany - Italy). The main entrances to the town consist of two avenues with Italian stone pine (*Pinus pinea* L.). This species is known to cause damage to the roadway due to numerous surface roots and makes it dangerous; therefore stone pine shows asymptomatic sudden fall of branches (due to torsion of branches, to wind or snow load, summer heat) or of whole plants. After an accident (fall of one of the pine trees), which fortunately did not result in casualties , the city administration decided to give assignment to the University to conduct a study on the propensity to failure of Viale Matteotti pines and to evaluate the possibility of replacing all the pines with other species. After evaluation with methodology VTA and application of pulling test , the 130 pines resulted healthy but with poor anchorage of the roots due to plant age (90 years old) and rooting conditions (steep escarpment and asphalt, restored several times with radical cuts). The study was conducted to determine all the possible constraints to envisage citizenship and was subsequently initiated a process of participatory planning. Two meetings with citizens, eager to participate and contribute to the ultimate objective, were enough to explain to them the reasons of pine cutting and to find two solutions to reduce the impact and maintenance: 1) retrain the avenue with plane trees or 2) with oaks and linden trees , alternating them on each row. The solutions were both valid and the citizens voted preferring the former. Within a few months the project has been drawn up with the new solutions and in November 2013 was carried out . The success of participatory planning was evident because citizenship is now satisfied with the result and waits anxiously to see grow new plants, with the knowledge that everyone has personally contributed to the goal.

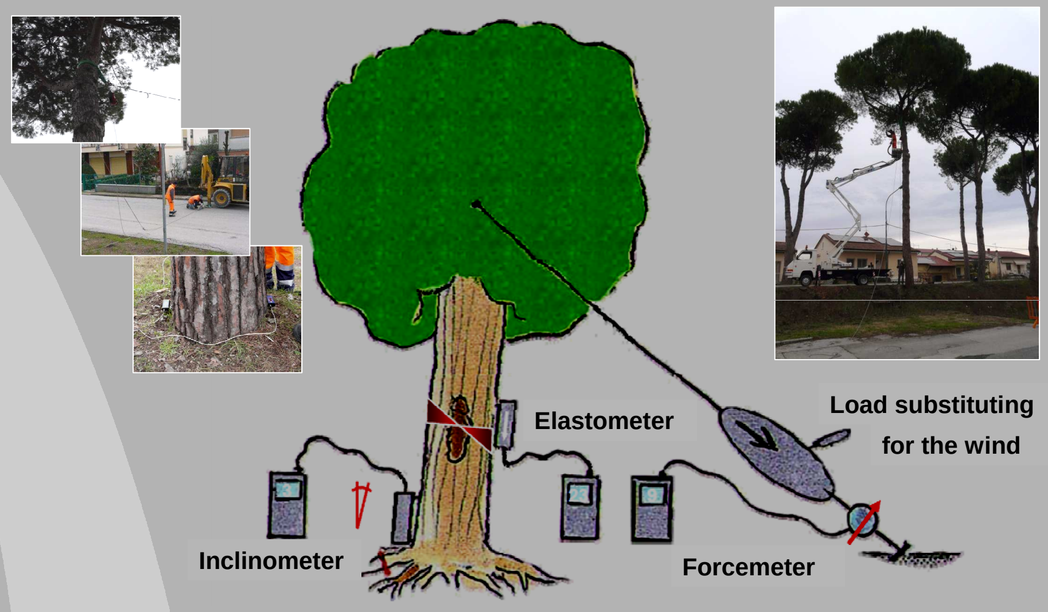
THE MAIN PROBLEM: ITALIAN STONE PINES ALONG VIALE MATTEOTTI, OLD, DANGEROUS AND UNSAFE TREES





Italian stone pine (*Pinus pinea* L.) is umbrella pine, a very distinct tree of small to medium size developing a characteristic dense, flat-topped or umbrella-shaped head. A picturesque pine, particularly suitable for sandy soil and maritime areas.
When 90 years old in urban areas, the species shows a strong propensity to failure, especially for the low resistance of the root system in particularly conditions (excavations near the plant base, asphalt resurfacing with root cutting, waterlogging), even if plants look healthy. In addition, the large surface roots causing serious problems to the sidewalks and asphalt roads with possible danger for the users.

APPROACH TO THE PROBLEM: VTA AND PULLING TEST



The only visual analysis (V.T.A. = Visual Tree Assessment) was not sufficient to define the pines "dangerous" (plants were been classified B and C, in 2009, according to the failure risk classification of ISA), so it was necessary to investigate plants in another way, with an instrumental analysis (pulling test).
A sample of seven pines was randomly chosen.
The results of pulling test confirmed that the root systems of six pines were not able to withstand the stresses caused by atmospheric events with wind intensity over 30,00 m/s corresponding to 108 km/h.

So the safety of people and property was at risk strongly and it was decided and allowed (by Soprintendenza per i Beni Architettonici e per il Paesaggio and per il Patrimonio Storico Artistico ed Etnoantropologico) to cut all the trees of the avenue.



APPROACH TO THE SOLUTION: CITIZEN PARTICIPATION IN DECISION MAKING



The Mayor of the Municipality promotes the design laboratory "The avenue that I would like." During several evening meetings were evaluated possible solutions for the new structure of the avenue, pointing out that the mode of recruitment of the actors of the participatory process was that of the "open door" (any citizen could decide whether to enter or stay out in the process). He also pointed out that the meetings were conducted using the methodology of the "jury of citizens."
So the guidelines for proper rehabilitation were given, starting from size and shape, color and density of the foliage, bark color, silhouette, examples of existing avenues, and then switching to the detailed description of the species best suited to the context in question.
The first decision concerned whether to use one or two species or varieties (the choice fell on a single species).
The second whether to use evergreens or deciduous (the second solution was considered the best).
The third was the choice between the solutions found: the majority of people present chose the plane tree. It was decided to use the clone Platanor® "Vallis Clausa" for its resistance / tolerance to canker stain, marketed in Italy exclusively from Piante Mati nurseries in Pistoia.
Three citizens volunteered to oversee the project and the choice of plants in the nursery.

THE SOLUTION: A NEW AVENUE PLANTED WITH PLANE TREES

The final design was drafted by the University (DESTeC Engineering). The choice of this species was dictated by its aesthetic beauty, the final size (the first magnitude with the possibility of having a free stem of at least 5-6 m long at maturity) and the medium-high hardiness, rapid growth rate and easy anchoring on the slope, and, not least, the final diameter of the canopy that allow to get the tunnel effect of landscape effect. In addition, other aspects are the connection with the planes of the town square, the color, spotted, pale bark, clearly visible even at night, and the longevity of the species for which the avenue will be appreciated for years to come.

The new trees were planted at a distance of approximately 9,00-10,00m on row, in relation with the lighting system, the size of the mature plants, and an alternating arrangement along the whole development of the road tape. These distances were obviously increased at critical points where it was necessary to ensure the continuity of private access, in according with citizens' decisions. In September 2013 the stumps of pine trees cut down were taken off and plants were chosen in nursery. In October was installed the new lighting system and the location of the plants was marked on the sides of the road. Piante Mati nurseries planted the 88 plane trees in the first decade of November and installed a watering drop system. On 21 November 2013, the Mayor opened the avenue at the presence of citizens and school pupils.

References
Austin, M.E.and Kaplan, R., 2003. Identity, involvement, and expertise in the inner city: some benefits of tree-planting projects. In: Clayton, Susan; Opotow, Susan, eds. Identity and the natural environment: the psychological significance of nature, Cambridge, MA: The MIT Press: 205-225.
Mattheck C., 2012. Update field guide for Visual Tree Assessment. Verlag Forschungszentrum Karlsruhe.
Mattheck, C., K. Bethge, and D. Erb., 1993. Failure criteria for trees. Arboricultural Journal 17: 201-209.
Rosol M., 2010. Public Participation in Post-Fordist Urban Green Space Governance: The Case of Community Gardens in Berlin. International Journal of Urban and Regional Research, Vol. 34.3: 548–63.
Wessolly, L., 1995. Fracture diagnosis of trees Part 1: Statics-integrated methods - measurement with tension test, the expert's method. Stadt und Grün 6: 416-422.

Key words: *Pinus pinea*, *Platanus x acerifolia*, *pulling test*, *VTA*

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