

Maintenance: From Waste and Indifference to the Ethics of Responsibility

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Abstract

The maintenance is a formidable lever of competitiveness for the companies and a style of life for all the citizens, allowing to get important economies and guaranteeing both effectiveness and sustainability (De Coster, 2008).

In the industrial companies it happens with always great frequency that the maintenance is considered a cost, if possible, to avoid (Nakajima, 1988). The wastes consequential from the missed maintenance immediately are not visible and the indifference toward the subject doesn't help to have a perspective vision on the possible future benefits if compared to the inevitable present costs.

And could be made some examples that concern the whole anthropic space.

Rather than care and maintenance, more easily it is found abandonment and crumbling. And consequently wastes. The Maintenance is a choice of life a mental *habitus*, that behaves a revolutionary change of mentality.

The maintenance can represent a hope for the future of the world, stimulating the citizens to preserve, to reduce the waste, to act in safety, to conduct a sustainable existence that makes livable our cities and efficient as virtuous our factories, in respect of the environment and the human life (Cattaneo, et al., 2007).

Keywords: Waste, Environment, Sustainability, Preservation, Prevention.

1 Maintenance and ecology

In the 1990 Giovanni Ferracuti wrote that maintenance culture and environmental culture are communed in the same dimension ideological and ethics¹, but this match begins from very distant (Ferracuti, 1990).

A few years before, in 1987, during a seminar organized by AIMAN and CENSIS, from the eloquent title "To

¹ Giovanni Ferracuti, "Per una definizione della manutenzione ambientale", in "La Manutenzione Urbana", a cura di Gianfranco Dioguardi, ed. Il Sole 24 Ore Libri, Milano 1990, p. 51.

"La critica ad un modello di sviluppo basato incondizionatamente sulla crescita e sull'espansione, l'opposizione allo strapotere delle tecnologie sulla natura, il rifiuto della dilapidazione di risorse sempre più evidentemente limitate e non rinnovabili, sono i principali elementi costitutivi della piattaforma che accomuna cultura manutentiva e cultura ambientale nella stessa dimensione ideologica ed etica".

Produce is not enough", Nuri Bilgin, a sociologist of the European community, so entitled his memory: "From the industrial society to the maintenance society"² where it observed that the level of effectiveness and maintenance competence is one of the parameters used by the European Community to identify the development degree of a nation (Bilgin, 1988).

The Manual of Maintenance Industrial Plants³, whose before edition is from 1974 (Baldin, et al., 1974), in the first chapter examines the results of the study that a MIT group driven by Donella Meadows has conducted in 1972 for the Rome's Club on the "Limits of Development", to testimony of the hold affinity that these themes have with the maintenance and of as such affinity both of long date.

Concluded Donella Meadows with these words: «the culture of the maintenance is the only alternative to the uncontrolled development of the productive tasks that will bring the humanity to the disaster» (Meadows, et al., 1972).

We want start from here.

2 Waste, indifference and post-industrial society

Last century has been marked by the uncontrolled growth of the waste which has contributed the happy-go-lucky irresponsibility of the citizens that more and more have shown to love the products "uses and throws", without maintenance and, often, without cleaning.

The "waste management " has dominated, at least till now, the first pages of newspapers and political notebook. In Italy, think to the matter of waste, for instance, in Campania that has seen engaged ministers, extraordinary commissioners, governors, without for this to close the story.

Our century, instead, is marked by the resources management. All the resources, not only those scarce, or hardly renewable, must be characterize from longevity and guarantee of recycling, definitely resolving the matter of waste and setting aside once and for all the alternative of "uses and throws" (Di Sivo, 2008).

² cfr. Nuri Bilgin – "Dalla società industriale alla società della Manutenzione" in Dossier Manutenzione – Censis, Note e Commenti, Anno XXIV, Numero 2/3, febbraio/marzo 1988, p. 156 e segg.

³ Asturio Baldin, Luciano Furlanetto, Antonio Roversi, Francesco Turco, "Manuale della manutenzione degli impianti industriali", ed. Franco Angeli, prima ed., Milano 1974, p. 21.

The resources management asks for an accurate maintenance. Only the systems that have very brief cycle of life are maintenance free. Not as soon as however it comes upon us in a system destined to last, the maintenance becomes a conclusive item for its economic exploitation. The opposite one of the "uses and throws".

The maintenance however it asks for care and responsibility, as much as the "uses and throws" was characterized by the indifference of the user for the fates of the object. It speaks therefore of ethics, of values, of responsible attitude, to have a mental *habitus* consistent with the objectives.

The post industrial society that has left each other in inheritance a mountain of wastes surrenders therefore the field to the maintenance society where to preserve well and for a long time it is the main predicate.

3 The maintenance society

The Maintenance is an a little attractive task, it is not as the marketing that makes to sell the products, neither as the last model of supersonic airplane that can reach 2.000 hourly kilometers. The tasks of maintenance don't pretend to transform the world, their objectives are not expressible in simple way, they don't have the charm cut-breath of task that produces objects with elevated performances, they continually go and periodically repeated, if they are successful their effect is not seen (Perotto, 1993).

An analogous discourse is worth for the Politics. The politics reasons on brief cycles, at the most three five years, coherent with the electoral cycles. The anxiety of the reelection makes a arduous great deal to take a stand on the thematic ones of maintenance that have development cycles two three times longer in comparison to the electoral cycles.

And as many it happens to the dominion of the human resources: to engage the users in the maintenance, the citizen as the company technician, is not easy and behaves a revolutionary change of mentality. Items key for the change, for both, are: the information (conferences, seminars, congresses) and the formation. It needs to take action that is a tortuous path and in slope, with several troubles.

The transition toward the maintenance is not therefore neither immediate neither painless, but it is necessary to have a future and to guarantee the aka sustainability (Di Sivo, 2004).

4 The Maintenance as preservation strategy

We are literally submerged by news that they concern natural catastrophes, disasters, accidents due to the non-observance of maintenance norms, to the lack of maintenance intervention, to imputable errors to inadequate maintenance actions (Cattaneo, 2001).

Here is some example:

- The 10th July of 1976 from the ICMESA, near Seveso, in Italy, escaped a cloud of dioxin that poisoned inhabitants and animals for about ten kilometers from the factory. The safety valve intervening to protection of a chemical reactor out of control dispersed in the atmosphere the dangerous component, an area of containment not having been

designed. The damages to the environment and the people impressed a lot the public opinion and they pushed the Italian Parliament to promulgate a law that taken note the name of "law Seveso."

- The 25th May of 1979, in the United States, the flight American Airlines with 271 people on board it broke to Chicago shortly after the take-off. It was the most serious aerial accident, for number of victims, in the United States, if are excepted the crashes of September 11th 2001. The accident was determined by the separation of a motor in phase of take-off caused by an inadequate action of maintenance revision. To save time and costs, the builder's indication were not followed, in the disassemblies and in the assemblage of the motor.
- December 2nd 1984 to Bophal, in India, there was the most serious chemical-industrial accident of the history. An escape of isocyanate of methyl, abandoned in the tanks of the factory closing for months, private of all the alarms and of the ordinary maintenance, was highly caused still by the cleaning of the tubs floods of this toxic chemical mixture and from the explosion that it derived of it when the isocyanate was reached by the water used for the cleaning.
- The 12th August of 1985, the flight 123 of Japan Airlines, depart from Tokyo to Osaka, fell provoking the death of 520 people. It was the most serious aerial accident for victims' number needed to an only aircraft. The accident happened around 12 minutes after the take-off because of a serious damage in the system of back pressurization that integrally damaged the hydraulic plant making the airplane ungovernable.
- The 14th April of 1991 the oil-tanker Haven⁴ from 250.000 tons, sank offshore Arenzano (in Italy, between Genoa and Savona) causing the most serious ecological disaster of the Mediterranean, for an explosion caused by the malfunction of a pomp during the petrol transfer. They burned over 90.000 petrol tons to which were added 1.000 tons of ship fuel. Other 50.000 petrol tons they now pollute all the backdrops between Genoa and Savona.
- June 3rd 1998 near Eschede in Germany, was had the most serious railway accident needed to a train to high speed, 101 people they died and others 100 remained seriously wounds. The main cause of accident was the breakup in the first carriage of a rim as parts of a wheel of third axel. Originally the wheel was fused in a sol piece but, subsequently, to reduce the vibrations that penalized the march comfort, an "improving" intervention was realized with the introduction of a ring in rubber between wheel and rim. Such modification was not compatible with the high speed of the train.

The consequences of lack or inadequate maintenance are economically very onerous and, sometimes, in terms of human life. At times the lack of reliability can be fatal (Blanchard, 1978).

⁴ Curiously Haven is very similar to Heaven.

Nevertheless the concept of reliability resides in an area on border between planning and maintenance (Moubray, 1988), while we now want to put to fire the maintenance role in the preservation of an object, up to that the maintenance and/or its reparation they don't result more economically convenient (Patton, 1988).

The orientation of the maintenance in sense to lengthen the duration of life of the objects is a clear item of opposition to that culture of "uses and throws" that so many damages has produced in our society.

The maintenance as a strategic approach to preservation conducts out this subject of the engineering domain from where has had origin and has moved the first footsteps, to enter a philosophical circle where the central item they are the values of which the maintenance is bearer.

The maintenance science places so in an area of border between the engineering dominion and the humanistic sciences dominion of the where if from a side there are normative, practices, methods, models of clear engineering derivation, from another side we assist to a work of direction that has for goals the sustainable development of the human tasks.

The sustainability becomes therefore the last purpose of maintenance as it same it is set as an instrument to maintain in the time the functions of anthropic systems and of many natural systems. Deprived of maintenance in once brief such functions would relatively be lost irremediably. In other words said systems, deprived of maintenance, they would not be sustainable.

5 The maintenance, related to the object, has a character of universality

Abandoned the technological aspects bound to the maintenance and the functions of the underlying physical systems, the maintenance on the theoretical basic and of principles have a character of universality, being able these rules to be applied on an any physical system. Paradoxically freed the maintenance culture by the references to the technologies of underlying systems, he will discover that it also becomes easily applicable on abstract systems as the organization.

This exercise also allows to estrange the meaning of maintenance from that idea of "repair action" that in a lot of societies it is still the prevailing idea that people have some maintenance.

Clarified that the maintenance is a whole theories and methods directed to anticipate and if possible to eliminate a maintenance action, and it doesn't coincide at all with the same maintenance action, he will be able to this point to appreciate all of values of which the maintenance is bearer, and that they have a wide field of application from the industry, to the built environment, from the cultural and environmental assets, to the archaeological assets.

Around 2.500 years ago Ippocrate it said not to teach to take care of the illnesses, but to teach the health to make to last the organism for a lot of time. It is some that to which contemplates the maintenance, it doesn't teach whether to repair the equipments, but as to avoid the breakdowns to indefinitely prolong the physical life of the object.

6 Against the wastes

Together with the prevention and the preservation, among the values brought by the maintenance there is the wastes hunting.

The casuistry of the wastes is very wide: he goes from the energy to the products, from the natural resources as the water or the air to the output of the systems, from the recycling of the wastes to the retrofitting/revamping of the objects, and so on.

The maintenance teaches to save, or rather to get the same results with a smaller contribution of resources, owing since the origins to make the accounts with the shortage, before among all that of the maintenance budget.

The maintenance allows to immediately translate the observation of the wastes in the consequent improving actions.

This is worth, over that in the industrial world and in the built environment, in the dominion of the environment, in the dominion of safety, in the dominion of energy and in the dominion of pollution, or in those areas of interest risen as direct consequence of the advent of the industrial society before, and of the post industrial era then. They are the matters on which mostly the citizens are questioned, the matters that occupy the first pages of the newspapers, the matters that make sensation for their duty on the quality of the life and on the life of all us (Ferracuti, 1994).

Well, the maintenance integrates all these aspects furnishing the correctives, for the one that knows them to see and to listen, necessary to guarantee a harmonic development of the society in the perspective of a sustainable future.

7 Maintenance: a hope for the future of the world

Here now to appear in all of her depth of vision, the sentence of Donella Meadows that we have commented to the beginning.

The Maintenance Culture represents a bank against the uncontrolled development of the human tasks and the preservation culture to it subtended it will allow the humanity to conduct a sustainable existence.

We look confident to the maintenance. The overcoming of a "techniques vision" of the subject has allowed us to observe more in there, of "to go over" the mere application of formulas and methods, taken values and universal principles that inspire rather than "as to do", the "because must be done it" where the strategic objective is the sustainability.

When an industrial enterprise, as any other enterprise, includes the concept of sustainability, then it will have the instruments to use maintenance to the best and to do a formidable lever of competitiveness of it.

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