

Mirce-mechanics

The philosophy of Mirce-mechanics is based on premises that the purpose of existence of machines is to do a work by delivering intended function(s) thought time, like transporting, communicating, cooling, informing, computing and others with measurable performance, like speed, capacity, frequency, power and similar physical quantities. However, experience teaches us that in-service life of machines is dominated by complex interactions between their consisting parts on one hand and their interactions with natural environment and human actions, on the other. As result a variety of mechanical, electrical, chemical, thermal, radiant and other types of energy are generated, some of which causing failures of machines to deliver intended function(s). Actions like servicing, repairing, testing, replacing, changing the mode of operation and similar that are required to regain functionability¹ of machine. Hence, in Mirce-mechanics a machine with associated in-service tasks, resources, constraints and environmental conditions constitute a maintainable system, which is ultimately and uniquely responsible for delivering functionability performance of a machine.

As all physical phenomena associated with the functionality of machines are characterised by certainty, reversibility and independence of time, location and human influences, their functionality performance can be accurately predicted by making use of well understood laws of natural sciences, such as: Newton's laws of motion, Maxwell's law of electrodynamics, Coulomb's law of solid friction, Boltzmann's law of thermodynamics, Hook's law of stress and strength, to name a few. However, the information regarding functionability performance of a machine within a given Mirce-system is almost non-existent at the beginning of in-service life. The reason being, all associated functionability phenomena are characterised by uncertainty, discontinuity, irreversibility, inseparability, and are dependent on time, location and human influences, Hence, the laws of natural sciences cannot be used to predict functionability performance of a maintainable systems in Mirce-mechanics.

To address rationally essential questions of the accurate predictions of functionability performance of machines in 1999 Dr Jezdimir Knezevic resigned from Exeter University, UK, and established the MIRCE Academy at Woodbury Park, Exeter, UK. Staff, Fellows, Members and students of the Academy have endeavoured to subject in-service behaviour of a maintainable systems to the proven methods of science and mathematics to:

1. Experimentally observe and measure their functionability performance of maintainable systems that are quantified through the work done by a system and the work done on a system throughout in-service life, together with the resources consumed in these processes², and prevailing environmental conditions, to determine their patterns in respect to time.
2. Scientifically understand physical phenomena that govern occurrences of functionability events³ through life of a given maintainable system to the level of the dimensional fidelity ranging from the atom (10^{-10} metres) to the Solar System (10^{10} metres).
3. Mathematically define a scheme for calculating expected functionability performance for a given maintainable system (uniquely determined by the physical properties of consisting parts and their configurations) within a given operational scenario, environmental conditions, maintenance policies, support strategy and in-service constraints.

Decades of research has generated new, science-based, body knowledge, named Mirce-mechanics. It comprises of axioms, laws, mathematical equations and calculation methods that enable accurate descriptions of functionability phenomena that are characterised by uncertainty, discontinuity, irreversibility, inseparability, and dependence on time, location and humans. Thus, Mirce-mechanics enables accurate predictions of the expected functionability performance of a given maintainability system, at the time when it is possible to achieve the best compromise between all feasible solutions and stake holders.

¹ Functionability, n. ability to deliver intended function, Knezevic, J., Reliability, Maintainability and Supportability – A probabilistic Approach, Text and Software package, pp. 291, McGraw Hill, London 1993. ISBN 0-07-707691-5

² Boeing 747, registration number N747PA, been air born 80,000 flying hours, transported 4,000,000 passengers, burned 271,000,000 gallons of fuel while receiving 806,000 maintenance man-hours and consuming: 2,100 tyres, 350 brake systems, 125 engines, among other parts, during the 22 years of in-service life, at Pan Am airlines.

³ Any event, natural or induced, that impacts the functionability performance of maintainable systems.