Cosmic-rays are highly energetic particles showering Earths with a remarkable consistency and unique properties. Such particles are believed to originate from the vicinity of astrophysical shock waves produced by powerful events as the explosion of Supernova or $\gamma$-ray bursts. In such environments, non-thermal particles are expected to experience a Diffusive Shock Acceleration (DSA, a.k.a. Fermi acceleration) mechanism. This scenario, built back in the early 1970’s, assumes the presence of a magnetic turbulence on both side of the shock front leading to a diffusive motion of the supra-thermal particles. Over the last decades, important theoretical progresses have been made in the identification of the instability mechanism believed to give birth to the aforementioned magnetic turbulence. In the last decade, the use of Particle-In-Cells (PIC) simulations have provided a way to describe numerically and in a self-consistant way, the interplay between the cosmic-ray, the thermal plasma and the magnetic field. Such numerical tools have shown than indeed a streaming instability is triggered by high energy particles and that those particles are experiencing an acceleration mechanism believed to be the Fermi acceleration. However, PIC simulations do have some limitations as the particles considered in the simulations have to stand for both thermal and non-thermal populations. This leads to the use of a gigantic number of particle in the simulations, hence limiting both the scale and timescale of the phenomena. A alternative way to describe the acceleration mechanism has been initiated recently: the use of magnetohydrodynamics to describe the temporal evolution of the thermal plasma and magnetic field while non-thermal particle are describe using PIC techniques. After describing the way one can link MHD and PIC, I will present the results of PI[MHD]C simulations showing both particle acceleration and magnetic field amplification occurring in the vicinity of non-relativistic shock waves. Various cases will be presented in order to illustrate the influence of both the shock obliquity and alfvenic Mach number upon the magnetic field amplification and particle acceleration.