It uses a numerical technique called the finite element method (FEM). There are many finite element software packages, both free and proprietary [8-11]. An artificial neural network (ANN), often just called a "neural network" (NN), is an interconnected group of artificial neurons, that uses a mathematical model or computational model for information processing based on a connectionist approach to computation. In most cases an ANN is an adaptive system that changes its structure based on external or internal information that flows through the network [12]. The present work is devoted to study the effect of the extrusion process on the mechanical properties of A355 and A356 alloy reinforced with different weight percentages of silicon carbide particles. This study made by simulating this process using computer software based on the finite element and artificial neural techniques, after validated all software by comparing the predicted results from this software with the experimental results. The validation process done by using simulation model prepared by tin-lead alloy reinforced with silicon carbide particles.

Experimental Work

In this section, experimental processes have been explained to validate the finite element software (JL Analyzer). SiC particles with different percents of volume fractions (10,15and 20) used as reinforcing particles for production of particle reinforced Pb-Sn alloy matrix composites. Particle was mixed by stirrer in the liquid alloy, and then poured into dies to solidify composite specimens. The specimens were deformed at temperature ranging from 247 to 308 0C. All extruded specimens had a diameter of 20 mm before extrusion and had a final diameter of 16 mm and 12 mm after extrusion with reduction ratio in area 20% and 40%. Table 1 shows the tensile properties of the specimens; Figure 1 shows the effect of liquid fraction on ram speed at different die angles.

Finite Element Modeling

To use the finite element software a validation process are made by applying this software on the Pb-Sn alloy matrix composites reinforced with deferent volume percents of SiCp as cast and as extruded to predict the deformation and tensile behaviour. The predicted results and the experimental results then compared to validate the software.

In Extrusion

A finite element code JL analyzer simulation simulated extrusion process. JL Analyzer Engineering solution, developed to analyze the two-dimensional plastic deformation. Finite element simulation performed for each combination of variables to predict the ram speed in extrusion process in each case. Predicted results from JL analyzer soft ware illustrated in figure 1. The investigations proved that results of the finite element simulation for extrusion of semi solid alloy revealed a good agreement with experimental results.

Tensile Tests

Tensile tests ware simulated also by JL Analyzer Engineering solution. In tensile test simulation, the specimen is presumed to drawn axially through two jaws. The jaws were forces. Two temperatures (room temperature and 1000 C) and two cases for the material (as cast and as extruded) were considered in the finite element model simulations. Predicted results for the Pb-Sn alloy matrix composites reinforced with SiC particles with deferent weight percents were summarized in table 1.The results of the finite element simulations show good agreement with the experimental results.

Neural Network Modeling

To use the neural network software a validation process are made by applying this software on the Pb-Sn alloy matrix composites reinforced with deferent volume percents of SiC particles as cast and as extruded to predict the wear behaviour. The predicted results and the experimental results then