THE DEFENSOR CHIEFTAIN TUESDAY, JUNE 29, 1982, P. 1

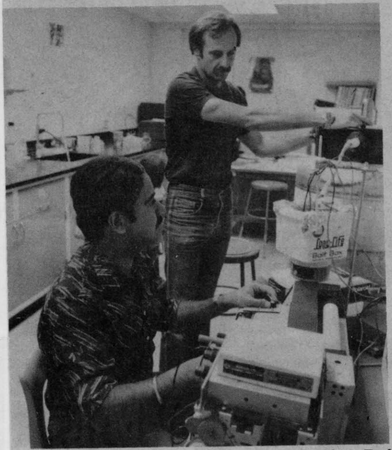
Tech Metallurgist Awarded $202,000 Grant

For 3,000 years, man has known steel can be strengthened by quickly cooling the molten metal in water or oil, but he still does not fully understand what happens to the steel during this process.

The National Science Foundation awarded a three-year $202,000 grant to New Mexico Institute of Mining and Technology Associate Metallurgy Professor Marc Meyers to study the fundamental nature of the changes that occur in the molecular structure of metals during processes like the quenching of steel.

"This type of fundamental transformation," Meyers explains, "is still the most powerful means of strengthening metals."

Meyers is particularly interested in what happens to metals during an explosion. His curiosity was aroused when he worked at the Military Institute of Engineering in Brazil where he observed that interesting changes occurred in metals adjacent to areas that were hit by high speed projectiles.



STRENGTHENING METALS — New Mexico Tech Associate Metallurgy Professor Marc Meyers (standing) is studying basic changes that occur in metals under stress. Here, Dr. Meyers and graduate student Naresh Thadhani are cooling a metal to pinpoint the temperature at which the metal is transformed from one phase into another. (New Mexico Tech Photo)

Although changes occurred in certain regions of the metal, they did not take place in other areas of the same metal piece. Meyers found these transformations to be complex and difficult to study because they took place in a fraction of one-millionth of a second.

"Everything in an explosion," Meyers explains, "Occurs in a logical and orderly sequence, but it is difficult to understand because it happens so fast that we just perceive it as a boom."

Based on his earlier observations at the Military Institute of Engineering, Meyers proposed to use the shock waves produced by explosions as a "trigger device" for the transformation taking place in steel and responssible for the powerful strengthening occurring in them.

During his three year study, Meyers plans to control as many factors as possible to help him unravel the process.

He will use a special iron-nickel alloy that changes in a relatively simple way after impact by a high-velocity projectile. In contrast, Meyers says, regular commercial metals exhibit a large number of phenomena taking place concurrently, and "one cannot arrive at rigorous conclusions."

A disc-shaped prejectile made of the iron-nickel alloy will be shot with a light gas gun at a target of the same alloy. The gun, which was invented at New Mexico Tech in 1946, uses compressed gas instead of explosives to drive the projectile.

Conditions such as temperature and impact speed, will be carefully controlled. Computer codes will be used to simulate the changes in the material. During different experiments, the temperature will be varied from -60 degrees to 200 degrees centigrade.

The discs and metal targets will be prepared by the Terminal Effects Research and Analysis machine shop at New Mexico Tech. But the actual experiments will be conducted at Stanford Research Institute which has one of the best shock physics laboratories in the world, Meyers says. "However, we foresee the development of these facilities at New Mexico Tech in the near future with the creation of an Explosives Technology Research Center," he added.

After the carefully controlled experiments, the discs and metal sheets will be analyzed by Myers and graduate student Naresh Thadhani using electron and optical microscopes.

Meyers feels "there is a splendid opportunity for a metallurgist to make a solid contribution in this area.

"I have been working in this area for ten years," he says. "I could work in it full time for the next ten years, and I still wouldn't be completely done."

— NMIMT Release

SILVER CITY DAILY PRESS

J JUN 29 1982

New Mexico Press Clipping Bureau
Albuquerque, N. M.

Grant awarded

41

SOCORRO (AP) — The National Science Foundation has awarded a three-year $202,000 grant to a New Mexico Tech metallurgy associate professor. School officials say Marc Meyers will use the money to study the nature of changes that occur in the molecular structure of metals during processes like the quenching of steel.

Gallup Independent
Gallup, N.M.

B JUN 29 1982

New Mexico Press Clipping Bureau
Albuquerque, N. M.

Grant awarded

41

SOCORRO (AP) — The National Science Foundation has awarded a three-year $202,000 grant to a New Mexico Tech metallurgy associate professor. School officials say Marc Meyers will use the money to study the nature of changes that occur in the molecular structure of metals during processes like the quenching of steel.

Artesia Daily Press

G JUL 4 1982

New Mexico Press Clipping Bureau
Albuquerque, N. M.

GRANT AWARDED 41

SOCORRO (AP) — The National Science Foundation has awarded a three-year $202,000 grant to a New Mexico Tech metallurgy associate professor. School officials say Marc Meyers will use the money to study the nature of changes that occur in the molecular structure of metals during processes like the quenching of steel.