

New method recycles metals

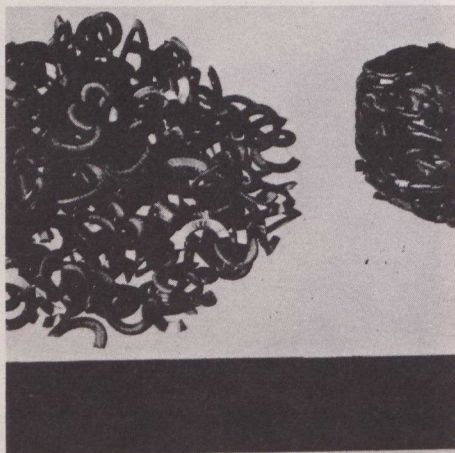
Tons of aluminum, iron and copper are lost each year in the form of machine turnings, called swarf. Canadian government scientists have developed the technology that could reduce this waste.

Machine swarf is produced in quantity in production machine shops, in metal and alloy billet making plants, and in integrated facilities for producing semi-finished metal products. In the order of 20 per cent of the metal ends up as swarf during the various machining operations in the manufacture of finished metal parts. In some cases the loss could be as high as 80 per cent.

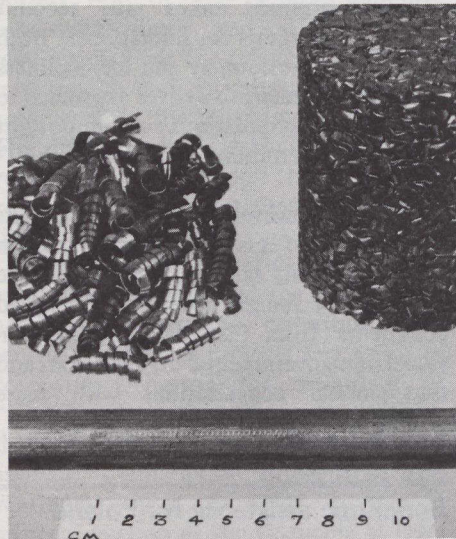
Easy to recycle

To a recycler, swarf is easy to reclaim. Unlike obsolete scrap, such as old car bodies, it is relatively easy to segregate. In most cases, it is produced on the site in large quantities of a given alloy type, and thus can be directly recycled to the alloy making process. Usually it is remelted, but this process is energy intensive and is characterized by high oxidation losses because the swarf is finely divided.

Scientists at the Department of Energy, Mines and Resources considered the tremendous savings if this metal could be recovered in useful form by methods like direct rolling or extrusion. A survey of possible processes for recycling swarf without remelting showed substantial energy saving. For example, recycling by alternating processes would require only a third of the energy for steel and about



Loose steel turnings, cold pressed billet and steel sheet.



Loose aluminum turnings, cold pressed billet and extruded aluminum rod.

two thirds for aluminum.

The next question was — can a useful product be produced by the non-melting route?

To answer this question the scientists carried out a program to produce steel sheet and aluminum rod from turnings without remelting.

Turnings of a bar of carbon steel, coated with machining fluid, were compacted in a steel die to produce cylindrical billets 51 mm in diameter by 51 mm high. These billets were coated with graphite to protect them from oxidation, heated to 1100 degrees Celsius in an atmosphere containing argon, then rolled into sheet 1.3 mm and 1.8 mm thick.

The recovered scrap sheet compares favourably with the conventional sheet and analysis shows little or no loss of carbon or other alloying elements.

To convert aluminum turnings to extruded rod, turnings from an alloy bar were cleaned and compacted in a steel die to give cylinders 76 mm in diameter by 89 mm long. For extruding, several billets were placed end to end in an extrusion press chamber, heated to 456 degrees Celsius and extruded into a rod 19 mm long and 9.5 mm in diameter.

The tensile and impact properties of the extruded rod show that it is even stronger than the conventionally produced aluminum alloy and has seven times the impact strength.

One of the researchers, Dr. H.M. Skelly, believes that material with properties at least equal to and very possibly superior to conventional material can be produced by processing swarf without remelting.

The process, in addition to conserving metal, is more energy efficient and produces less pollution than the present practice of remelting. It also eliminates the necessity of replacing alloying elements lost during remelting.

However, the recycled swarf does not have the same properties as the parent metal and could not supply the same market. To be economically feasible, new markets would have to be developed.

(From GEOS, Fall 1980.)

Special measures for Salvadorans

The Canadian government has announced special measures to assist persons affected by the unrest in El Salvador.

The measures are designed to help Salvadorans already in Canada and to reunite them with family members endangered by the conflict in that country.

The measures will allow Salvadorans, legally visiting Canada and who have relatives here to sponsor them, to be landed as permanent residents provided they meet health and security requirements. Legal visitors from El Salvador without relatives in Canada and who wish to stay permanently in this country will be issued minister's permits and will be allowed to obtain employment. After six months their cases will be reviewed and if they have become successfully established they will be landed as permanent residents provided they meet the statutory requirements.

Under the measures, Canadians and permanent residents in Canada with relatives who have been forced to flee El Salvador will be able to assist their family members to come to Canada under relaxed criteria. Salvadorans legally in Canada as visitors who want to stay until the situation in that country is resolved can apply to have their visitor status extended.

In recent years similar measures have been implemented to assist the victims of civil strife in Lebanon, Cyprus and Ethiopia.

The Canadian government is maintaining close contact with the Office of the United Nations High Commissioner for Refugees regarding the situation in El Salvador. In addition, Canadian immigration officials have travelled to that country to meet with those involved in coping with the crisis.