

MOOG

FRANK R. LINDSEY

October 9, 1979

MANAGER, MACHINING OPERATIONS
MOOG INC., AEROSPACE DIVISION
EAST AURORA, N.Y. 14052
716/852-2000

Microlon Canada

Van Couver, British Columbia

Attention: Mr. R. G. Smith,

Dear Bob:

On October 7th, 1979 we discussed the implication of future applications of Microlon in the industrial sector; particularly in the machine tool industry and the potential effect that Microlon could play on overall improvements in productivity. Since you, Alf, and I covered a wide range of topics and considerations, I thought it would be helpful for me to condense our conversations here at Jamestown into a general forecast of future potential and applications.

As you are aware, I have been conducting a series of generalized experiments to prove the validity of Microlon applications in typical machine tool and machine shop type operations within the machine tool industry. To date, my experiments indicate that tool life increases of between 50 to as high as 450% can be obtained through the addition of Microlon into flood coolant applications or simply treating cutting tools with Microlon for utilization in a "dry" cutting environment. The reports that you brought to Jamestown (reference Marcel Dassault Aircraft and Aerospatiale Aircraft) very closely coincide with all the test data that I was able to compile at Western Gear's Flight Structures Division. The depth of research and experimental data that Marcel Dassault and Aerospatiale have so far conducted are very much in accord with our test data and the depth of their experiments are certainly more than I have been able to conclude to date. The significant thing is that in an independent testing environment (and between three different machine tool environments) the test data closely correlates and supports each independent finding. I certainly concur with the general conclusion reached by Aerospatiale: "Wherever friction is significant (tapping and stamping, etc.) treatment with Microlon yields spectacular gain in quantity and quality, provided temperatures are not excessive. But since it should not be used at high temperatures owing to risk of toxic fumes, it is a product that we ought to employ as an aid in solving most of our machining problems. (With one small proviso: Cleaning of tools prior to application.)"

While the introduction of Microlon into the machine tool industry is certainly in its infancy, I believe I can state that the application of this product in industry will result in the most significant gains in overall productivity

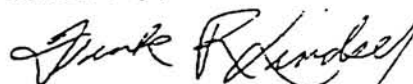
since the introduction of carbide tooling. When carbide tooling was introduced into the industry (some 20 years ago) the relative increases in productivity were closely comparable to the potential increase in productivity that the application of Microlon represents. The baseline philosophy of various french and other European corporations with their on-going applications of Microlon (in virtually all of their machine tools) is a philosophy that can be anticipated to be broadly applied throughout US and Canadian industry. There will certainly be some problems in getting "less than progressive" companies to "share the trade secret" of the application of Microlon, but proper exposure and marketing within the industry should easily overcome this very slight shortcoming.

In addition to greatly extending tool life, Microlon applications can be envisioned to greatly reduce maintenance where it is so applied in gear boxes, any type of ball or roller bearing application, or even in hydraulic systems where extremely close toleranced servo valves are present. This reduction in maintenance has an additional productivity benefit that can be realized with resultant significant reductions in "machine down time". Obviously, the more progressive companies within the United States and Canada will be the first to recognize the enormous productivity advances that the application of Microlon can achieve, and I think it will be very important to solicit and encourage complete documentation of results from credible companies as they introduce Microlon in machine tool environments. In this way, a large amount of data can be derived from actual "in the field experience" that can be of mutual benefit to all users without inordinate research and development costs being generated by any singular company. I would say that your field technical sales representatives will probably be confronted with some early questions regarding specific techniques in application and I would be certainly willing to share my experience so far gained and assist them with answering specific technical questions regarding application where I can. This, in turn, would enable me to further develop my "practical applications data" which can then be dissiminated through the International Microlon Distributors Association.

The long range implications for the application of microlon throughout the machine tool industry will probably be the most significant advancement in productivity that will be gained within the next ten years (with the current types of tooling now available). For some years now, manufacturers around the world have searched for ways in which to achieve significant increases in machine tool productivity. Microlon represents a product that can be introduced with today's tooling and machines and realize productivity gains of between 20 and 300% (based upon tool life experiments conducted to date) without further investment in new capital machine tools or greater or more exotic approaches than our current tooling technology represents. I believe it is same to state that as soon as the "industry buzz" gets rolling you might have a difficult time keeping up with the demand, but I think that will be precisely the situation that Microlon of Canada (as well as the Manufacturer (Chemlon Corporation of Houston, Texas) will be confronted with. Historically, I can think of no other product that has been introduced, with the exception of Carbide tooling, that presents such an enormous increase in the productivity within the machine tool industry within the past 30 years.

If I can be of any further help or assistance to Microlon of Canada or the Microlon International Distributors Association, please contact me at the Moog Corporation in East Aurora, New York. (716-652-2000)

Sincerely,

A handwritten signature in black ink, appearing to read "Frank R. Lindsey". The signature is written in a cursive style with a large, sweeping flourish at the end.

Frank R. Lindsey
Moog Corporation
Manager, Machining Operations

FRL/dkn