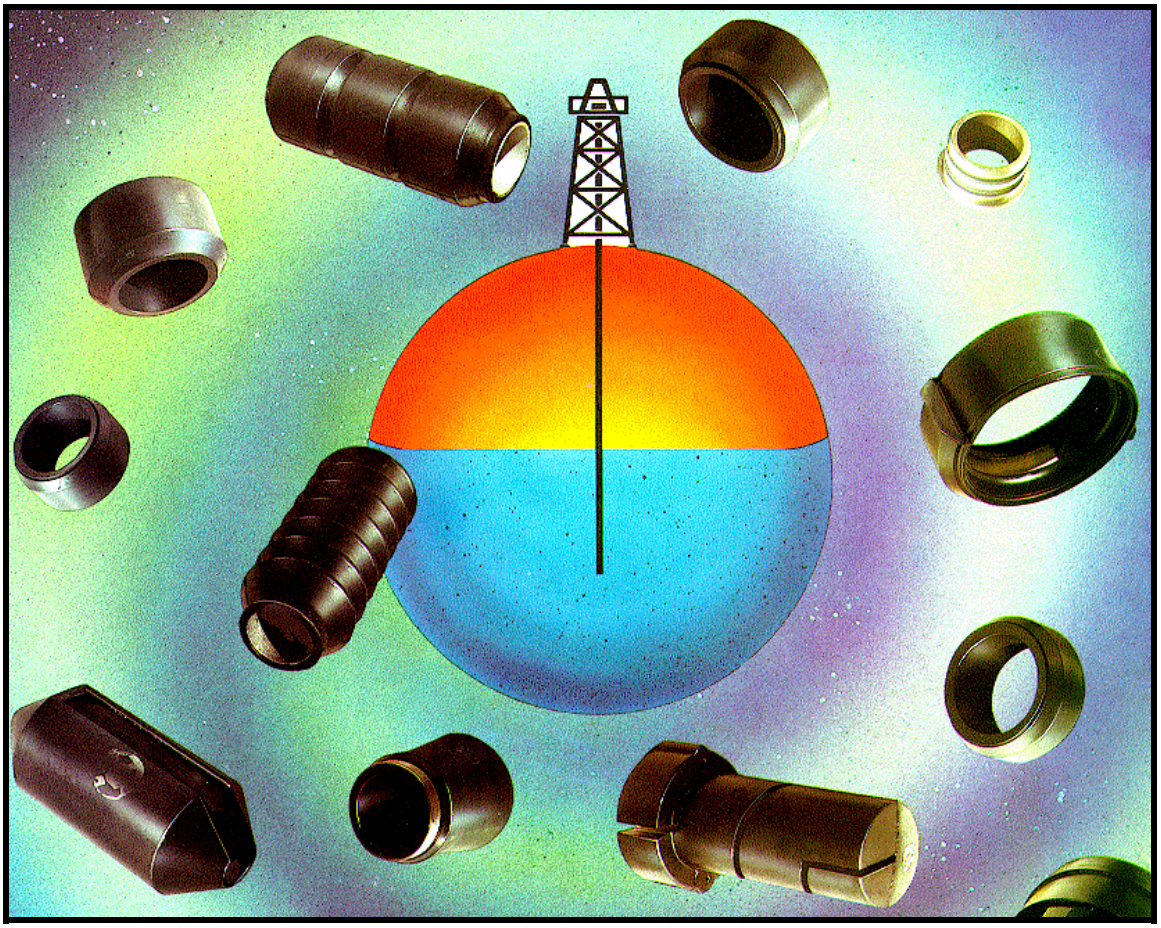
Chapter V.

History of Rubber in the Oil Field



HISTORY OF RUBBER IN THE OIL FIELD

It is a basic fact that rubber products for the oil field present many of the most difficult compounding tasks confronting the rubber industry. At best each formulation is an educated compromise based upon past experience, information garnered from a world of technical data concerning products designed specifically for other industries and some in-plant laboratory simulation and testing. Because we do not in most instances see the finished product in operation and we do not have an exact picture of the environment in which the product will operate, we can only assume the working conditions. Due to these acts, a formulation to be used in oil field products (especially down hole) must be designed to give the ultimate in the needed properties as so designated by a series of design techniques.

Herein lies one basic problem inherent in the production of rubber mechanical goods for the oil field. The oil tool design engineers are most competent and specific in their design of metal components and will go to any extreme to be completely confident of the materials used to meet a set of designated specifications. However, this does not spill over into the needed rubber components for the tool being designed. For sure, a physical shape will be shown with an indication of how the tool is to operate and what function it will perform. From this point, a classic statement has been proffered to the vendor of rubber products. "You're the rubber expert, you make it work".

This type of attitude puts the oil tool manufacturer at the mercy of the rubber parts vendor. Each vendor will do the best to make a product that will perform satisfactorily but the prime motivation, when no specifications are to be met, is to get production through their plant with a minimum amount of time, waste or reject material and with a maximum of profit. Since there is a lag (sometimes as long as one year) between production and use of the rubber part, many difficulties are allowed to progress due to the continued production without correction.

As problems arise, the oil tool engineer gets in touch with the rubber product vendor and asks what has happened to the quality of the products. With the lag of use vs. production, without good design specifications and without sufficient in-plant quality control checks and testing, it will be extremely difficult to arrive at a reasonable answer.

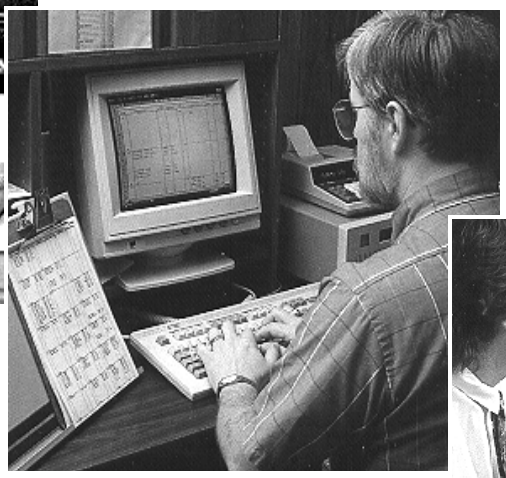
This situation has no need to exist. With a little guidance and acceptance from the rubber industry as a whole and the rubber product vendor of the design engineer's choice, the oil tool design engineer will be

able to set up a series of specifications that will fit the product requirements. This is the only sure method to use as a starting point to avoid premature failures of rubber products due to improper reliability design and testing. Again, keeping in mind the oil tool design engineer and the rubber design engineer form a team and together will be able to formulate a compromise compound and product design to arrive at the basic characteristics necessary for the product to perform the desired function.

In the following discussion will be set forth ideas for the methods and means to upgrade the quality of rubber products used in the oil field. Reliability of oil field rubber products begins with the oil tool design engineer and an effort should be made to carry the same thoughts all the way through to use and replacement. There is no reason why specifications for oil field rubber products cannot be as concise and direct as those for the aircraft, automotive or missile industries. Compounding rubber products for oil field use is in many instances much more difficult than the other three industries mentioned, but it lags sorely in scope and specifics due to the lack of required reliability design and production.

To begin a design control analysis one must first look at the grades and types of rubbers (elastomers) that are available for use in the oil field.

It begins with elastomeric engineers creating formulas and equations on specially programmed computers. It involves a mix of ingredients, curing temperatures, time and molding pressures to produce long lasting rubber products.



Computerized production scheduling

Engineers performing complete computer aided design on oil field tools and rubber products.

HOW TO KILL IDEAS

These comments sound familiar? Look out then. They're 24 idea chillers selected from a list of 56 put together by the New York Chapter of the American Society of Training Directors at a Brainstorming Workshop last year.

- Don't be ridiculous.
- We tried that before.
- It cost too much.
- That's beyond our responsibility.
- It's too radical a change.
- We don't have the time.
- That will make other equipment obsolete.
- We're too small for it.
- Not practical for operating people.
- The union will scream.
- We've never done it before.
- Let's get back to reality.
- That's not our problem.
- Why change it, it's still working o.k.
- You're two years ahead of your time.
- We're not ready for that.
- It isn't in the budget.
- Can't teach an old dog new tricks.
- Top management would never go for it.
- We'll be the laughing stock.
- We did all right without it.
- Let's shelve it for the time being.
- Let's form a committee.
- Has anyone else ever tried it?
- Too hard to sell.
- It won't work in our industry.