

SOFT RUBBER BULLETS

Mr. Dev Srivastava¹, Prof. Mrs. M.V. Ghamande², Mr. Amit Panpatte³

¹*Department of Mechanical Engineering, Vishwakarma Institute of Technology. (India).*

²*Department of Chemical Engineering, Vishwakarma Institute of Technology. (India).*

³*Department of Mechanical Engineering, Vishwakarma Institute of Technology. (India).*

ABSTRACT

*The paper presents the alternative of using **Soft Rubber Bullets**, instead of pellets, cork, hard rubber or rubber-coated metal bullets. It is based on a noble idea of saving more lives by using it to **control riots, protests** without causing any harm to the people involved in the same. It involves the usage of highly soft rubber bullets. These bullets are entirely made up of **natural rubber** which is tender, soft and is 300% elastic in nature. Also, it can be a cheaper alternative to the recreational bullets, and also it can be used for the training involved in the military and police.*

I INTRODUCTION

Soft Rubber Bullets, are something which is a slight modification to the current lot of rubber bullets that are made of either cork, which is impermeable and buoyant in nature and is obtained from QUERCUS SUBER (the cork oak) and suberin, or hard rubber(ebonite) which is made up of 25 to 80% of Sulphur and linseed oil. The idea behind the bullets are to cause minimal damage to people who are the receiving end of the law enforcing authorities during violent situations. It gives the shooting lovers and training academies a cheaper and safer alternative to practice and hone their skills.

2.1. Material

The material that is being used here is natural rubber. Natural rubber is polymerized isoprene.it occurs in the latex of plants like Havea brasiliensis and gangule found in tropical and subtropical countries, which is a waste product. It is procured by tapping into the bark of a mature Havea tree and is further processed to obtain the form of rubber commonly used in rubber bands, etc. This type of rubber is proposed to be shaped in the form of bullets and used for a plethora of purposes.

2.2 History of Rubber bullets

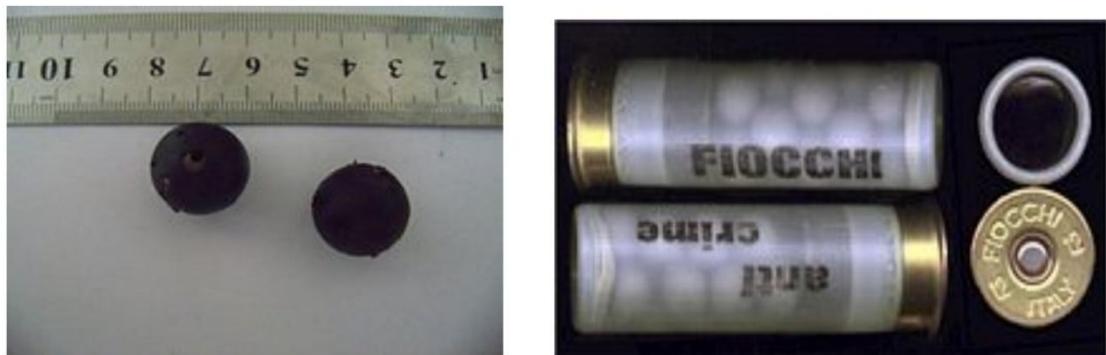
The first usage of rubber bullets i.e. cork form was done by the Royal British Army in the 1970's against the rioters in Northern Ireland in 1970. They took cue from Singapore, a colony which it ruled back in the 1880's who used broken wooden handles at the rioters. This lead to the inception of less-lethal weapons used for crowd control and recreation. The British just replaced wood with cork. In the late 1980's the Israeli Army used

rubber bullets on the Palestinians. The issue was they coated metal with rubber which caused the death of many Palestinians who were protesting. Rubber bullets were introduced in the United States in the 1960's to quell anti-war and civil war demonstrators.

2.3 Current use and Importance

In the recent times, the Barcelona police used a bullet made of vulcanized rubber against the Catalonia demonstrators in 2017. As per a Supreme Court verdict, the Honourable Supreme Court has asked the Indian Army to use a softer alternative for pellet guns for riot control in Jammu and Kashmir. The world isn't a silent place as there are always some or the other issues which cause a public outrage and ultimately lead to violent riots. The changes proposed in this paper will empower the law enforcement agencies to prevent fatalities to a great extent. The other use can be for training the cadets and personnel in the police and the army. The cost of rubber bands per gram is just a meagre Rs. 4. That means the cost of producing a rubber bullet must be Rs. 10 to Rs. 20, which proves that they are extremely cost effective. Since, rubber is highly elastic it can be reused from time to time.

III FIGURES AND TABLES



(Rubber balls used against protestors in 2013) (Ficcochi 12-gauge bullets/ rubber coated)



(The first rubber bullet used in 1970 by the Royal British Army)

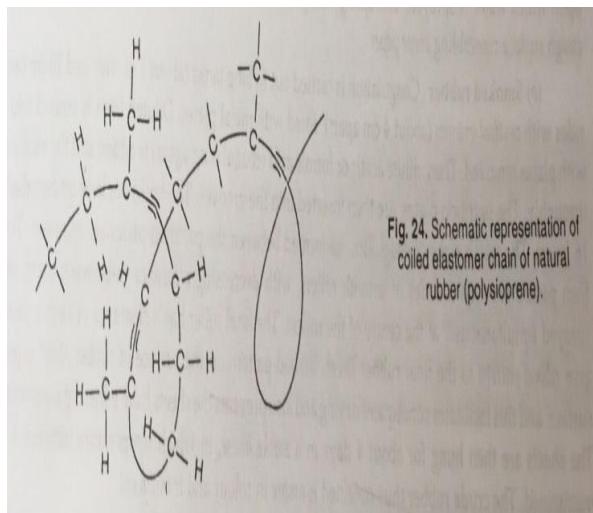
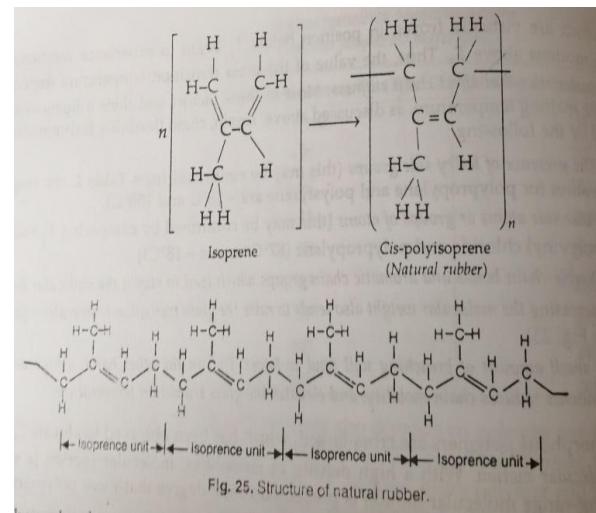


Fig. 24. Schematic representation of coiled elastomer chain of natural rubber (polysisoprene).



(Coiled elastomer chain of natural rubber)

(Structure of Natural Rubber)

IV CONCLUSION

Soft rubber bullets are an ideal alternative to the present lot of rubber bullets in the market as they are more cost-effective, elastic in nature. They can be used to control violent protests, riots and events of mass outrage that require crowd dispersion tactics. It can also be used for training purposes in shooting ranges. Recreational use of these bullets is also possible as they are low-cost and can be made easily available to shooting weapons. The very purpose of this paper is to reduce the use of pellets as they have known to be fatal in many cases. These bullets can prevent major injuries that are otherwise caused due to the present batch of rubber bullets as they are coated on metals and pellets.

ACKNOWLEDGEMENTS

We would like to thank my teacher Prof. M.V. Ghamande, as she not only supported our idea but also encouraged us to pursue it. We would also like to thank Mr. Prasad Padir who shed more light on the rubber types commercially available and helped us procure a small amount of natural rubber for the trials.

REFERENCE

- [1.] Modelling of elastomeric materials and products. JJC Busfield, Plastics, Rubber and Composites: Macromolecular Engineering, Vol. 40, 151-153.
- [2.] Natural Rubber Nanocomposites by in-situ Modification of Clay. D.J. Lowe, A.V. Chapman, S. Cook and JJC Busfield, Macromolecular Materials and Engineering, Vol. 296, DOI: 10.1002/mame.201000395
- [3.] www.slate.com
- [4.] www.theguardian.co.uk
- [5.] Engineering Chemistry, P.C. Jain, Dr Monika Jain, Dhanpat Rai Publications, 16th Edition.