

THE CASE FOR SAFETY AND SUITABILITY FOR SERVICE ASSESSMENTS TO BE BASED ON A MANUFACTURE TO DISPOSAL SEQUENCE

by

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ABSTRACT

The Australian Ordnance Council currently bases its assessments of the safety and suitability for service of munitions on the manufacture to target sequence. However, with ever greater concern being given to the effects of military activities on the environment, and the ever increasing pressures to ensure that our activities do not harm our environment, there is a case that future safety and suitability for service assessments must take into account the ultimate disposal of a munition to ensure that it can be disposed of in a way that is not harmful to the environment.

This paper examines the case for considering a manufacture to disposal sequence when assessing a munition for safety and suitability for service and also highlights a similar problem in regard to the effects on the environment of using munitions in training.

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Introduction

1. This paper does not profess to answer any questions. In fact, I hope that it will pose a few and at least sow a few seeds to get you thinking. Maybe some of you can provide ME with some answers. These I will welcome. In fact, I would be more than happy for this session to develop into a discussion session.

2. Also, I have slightly expanded the scope of the paper from the synopsis I submitted many months ago, and I hope that you will forgive me for that, but I feel that all of what I have to say is intertwined. And, I must point out from the start that while I have the average person's concern for the environment, I am not a 'greenie'. However, I am a realist.

The Present

3. Up to now, most organisations associated with the assessment of the safety and suitability for service of explosive ordnance have considered a manufacture to target sequence. That is, they have considered the munition from the time it is made to when it is used and for what period of time and under what conditions the item will remain safe and suitable for service. However, in the current environmental climate I believe that soon we will have to consider the manufacture to disposal sequence and, as well as continue to assess items under the current criteria, we will have to add on the ultimate safe and environmentally friendly disposal of the item when it ultimately reaches its assessed safe life. Further, I can see the time approaching when items will not be allowed to be introduced into service until such disposal methods have been developed.

Methods of Disposal

4. In the good old days, the disposal of life expired or unwanted munitions was a relatively simple matter. Many avenues were open including:

- a. deep sea dumping,
- b. burial,
- c. demolition,
- d. burning, and
- e. breakdown

to name a few. However, now all of these disposal methods are losing favour, if they have not already lost it.

5. Deep sea dumping is all but banned. There are concerns as to its long-term effects on the environment when (and if) the explosive ordnance which has been dumped ever leaks or if the explosive leaches out. Also, there is the problem of the dumped explosive ordnance coming back to haunt us. Quite regularly in Australia we hear of explosive ordnance being caught in fishing nets and although I expect that much of this caught ordnance is ordnance which has not been properly dumped, it still presents a problem and emphasises that we humans will take short cuts where we can.

6. Burial of explosive ordnance has its obvious problems. Contamination of the burial site with explosives and possibly toxic materials. And, are we really disposing of the items or are we simply hiding the problem? As sure as death and taxes, buried explosive ordnance will come back and will then present even bigger problems in disposal.

7. Demolition has always been a favoured method of disposal. It is quick and easy and gets rid of the problem. But it has its drawbacks. It creates noise, shock, vibration and pollution, as well as the flying pieces of red hot metal which can start fires and puncture people. And what of the residue that remains after a demolition? Is it toxic? Will it harm the environment? What about the wildlife that may also be destroyed along with the item of explosive ordnance? While many of these problems of demolition can be minimised, more and more demolition is becoming an activity which is harder and harder to undertake. Even in Australia with our vast open spaces, people find demolition unfriendly. For example, on a demolition range for which I had a 500 pound NEQ limit only 20 years ago, community pressure, primarily concerned with ground shock and noise, has cut that limit to 5 Kg (11 pounds) now. I think that it is obvious that such a low limit is virtually useless for any reasonable disposal operation.

8. Burning, too, has its drawbacks. Contamination of ground, and the concerns of what is being put into the atmosphere. What toxic materials are contained in the smoke and what is their effect on the environment?

9. This leaves breakdown. I guess that this can be environmentally friendly - or is it? What do we do with the recovered explosives? Can they be recycled? How can we dispose of them safely? And does the breakdown process produce unwanted by-products - like 'red water' from the washing out of TNT based explosives? I realise that with care, and at a cost, red water can be treated, but with some of the more modern explosives can we have the same?

The Future

10. So there is the problem. We have an item of explosive ordnance which is in all respects safe and suitable to use, but it has a finite life. How do we get rid of it? It is all very easy to say that when the item is life expired in 10 or 15 years time the disposal will be someone else's problem. But is this responsible? However, even if we ensure that an item can be disposed of safely and in an environmentally friendly way by today's standards, how can we be sure that such disposal will be acceptable at the end of the item's life? Quite simply, I do not believe that we can. Just as designers of explosive ordnance 20 or 30 years ago could not envisage the restrictions on disposal that we would have placed on us today. And, therefore, are we wasting our time worrying about the ultimate disposal of the item when we do not know what the required disposal standards will be in the future?

11. Notwithstanding the doubts about the future, I believe that it behoves us, those who have been charged with ensuring high standards of explosives safety today, to ensure that whatever we introduce today can be properly disposed of by at least today's standards. And, I guess that this is really the thrust of my paper today.

12. Despite what is contained in MIL STD 882C, I believe that we are not paying enough attention to the ultimate disposal of the items that we are assessing as safe and suitable for service in that we are only addressing the manufacture to target sequence. We must be realistic. We know that not every item of explosive ordnance produced will be fired or used. We all hold stockpiles of explosive ordnance as war reserve. We know that technology is moving ahead at a rapid pace and that our desire to have technologically advanced weapons will result in some of our stockpile of weapons becoming obsolete. Therefore, we know that many of the weapons that we hold will have to be disposed of. I submit that if we are to take our task of ensuring explosives safety seriously, we must include the disposal of an item in our assessment of whether the item is safe and suitable for introduction into service.

13. Of course, by accepting this challenge, an onus will be placed on the developers of weapons and explosives to consider the disposal of their creations.

The Training and Environmental Problem

14. Now moving onto the area of expansion of my topic. Again, explosives safety authorities have in their assessment of the safety and suitability for service of an item traditionally been concerned with the safety and suitability of the item as it affects our own personnel. The Australian Ordnance Council, at least, has not concerned itself with considering the terminal effectiveness of the item, unless of course that effectiveness has a direct bearing on the safety of our own personnel, for example, ejection seat cartridges.

But for, say, an artillery shell, providing that it can be safely fired and the fuze maintains the projectile unarmed for a safe separation distance from the firing point, and provided the thing goes 'bang' at the other end, we do not concern ourselves greatly with the ballistics or the killing power of the projectile. We then consider the item as safe and suitable for service. This, of course, is somewhat of a simplification, but in broad terms it is true.

15. However, many of our items of explosive ordnance intended for wartime use against an enemy are also used in training. No problem - providing we have consistent ballistics and adequate range safety distances. Or is there really no problem? What happens when the round reaches the target? Hopefully it will function. What are the products of its functioning? Will there, for example, be a residue of lead or cadmium left at the impact point? What other toxic substances will remain or be released? And, this problem is not confined to the larger calibre high explosive weapons. Small arms ammunition also must be considered for what remains after it impacts a target.

16. This problem was brought home to me only a couple of weeks ago when I was having discussions with one of our Defence facilities people. He stressed the importance of knowing what foreign substances had been introduced to the land on Defence ranges as if, and when, that land was returned to the public such information would be essential in the interests of public safety and in the planning of any clean-up of the area that was required.

17. So, I see that we may soon be facing yet another matter for consideration in our safety and suitability for service assessments. That of determining what the products of functioning or firing of an item are, and whether there could be a long-term problem created. This in turn may lead us to the problem of developing training ammunition (or even war shot ammunition) which does not leave or emit any toxic or undesirable substances on functioning.

18. This, along with the problem of disposal of ammunition which I discussed earlier, will be a difficult problem to resolve.

Summary

19. Therefore, in summary, I foresee two major changes coming along in the way in which we undertake safety and suitability for service assessments. I believe that soon we will be required to assess how an item is to be disposed of when it reaches the end of its useful life and that the item will not be able to be introduced into service unless it can be shown that it can be disposed of in a safe and environmentally friendly manner. Secondly, I believe that we will have to consider the products of the functioning of an item to ensure that such products are friendly and will not create a problem for the future.

20. In closing, I know I have not provided any answers, but I do hope that I have generated some thought. Maybe some of you have already addressed the problems I have outlined and, if so, I would welcome your comments.

21. I will not ask you for questions; rather, does anyone wish to comment on what I have said?