

## REBUILD OF THE M2A2 105MM HOWITZERS IN SOUTH VIETNAM (1971)

History Article by LTCOL David Miller RAEME (Retd)

### **Preamble**

106 Fd Wksp RAEME was raised at Nui Dat in South Vietnam (SVN) in November 1968. The workshop remained deployed at Nui Dat until it was withdrawn to Australia in late 1971. Its role in SVN was to provide repair and recovery support for equipment in use by the units of the 1<sup>st</sup> Australian Task Force (1ATF).

The 2<sup>nd</sup> line repair and maintenance of the Centurion Tanks of C Sqn 1Armd Regt was a responsibility it was given which was outside the 'norm' for a workshop of its type - but the manning of the workshop was adjusted accordingly to handle this responsibility.

What may not be well known is that during its tenure in SVN 106 successfully completed two complex tasks for which it was not properly established but which were completed expeditiously and successfully.

These were:

1. Commencing in July 1969, the progressive up-armouring modification of all 1ATF Armoured Personnel Carriers (APCs) - to provide greater driver protection against command detonated improvised landmines. The task went from concept, testing, proving and completion, in accordance with 1ATF priorities, as APCs (and modification kits) became available.

This story is written about in other parts on the 106 Fd Wksp Assn website and in Australian War Memorial articles.

2. In 1971, the successful rebuild of the guns supporting 1ATF operations (howitzers of 12 Fd Regt RAA and the Force reserve guns, 22 guns in total) - by a small and dedicated team of regular and national service soldier/tradesmen.

The necessity to fix the guns arose because of the need to maintain ongoing fire support accuracy and safety for troops on field operations.

Taking on the gun rebuild was a risky endeavour from both an operational and a technical perspective as 1ATF was concurrently completing preparations to return to Australia but still needed to have a high level of accurate fire support available at call; the successful rebuild results were well beyond the expectations of the technical gurus in Australia at that time and more than met the Commander (COMD) 1ATF's requirements.

The following article by David Miller, the officer who led the rebuild team, tells the story of how it was done, subsequently enhancing 106's performance reputation in the SVN theatre.

LTCOL John Strachan RAAOC (Retd)

President

106 Fd Wksp RAEME Assn Inc

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BY 106 FD WKSP RAEME  
NUI DAT SOUTH VIETNAM 1971**



105 mm M2A2 Howitzer rebuilt by 106 Fd Wksp RAEME Nui Dat South Vietnam 1971.  
“A Veh” hangar in background. Photo by CAPT David Miller.

**Account by LTCOL David Miller RAEME (Retd).**

**Logged 106 Assn Website March 2016**

In March 1971 I was the Platoon Commander (CAPT) of the General Engineering Platoon (GE Pl) at 106 Fd Wksp Nui Dat South Vietnam (SVN). My platoon comprised a mixture of tradesmen - regulars, nashos and a bevy of Warrant Officers (some filling lower rank positions). This combination of regular/nashos and experienced senior ranks gave us a trade base better than would usually be expected in a field workshop. Of particular benefit to the platoon then was an experienced welder (National Serviceman) whose rebuild of mine damaged M113 hulls was exceptional.

Work progressed at the usual hectic pace of a Field Workshop but work was compounded by:

- a variety of equipment not normally found in a Task Force (e.g. topographical survey map making equipment, battle intelligence PDP11 computer),
- SAS ‘specials’ etc.,
- the effect of the tropics on equipment,
- an increased repair load as the Task Force prepared to withdraw later that year, and
- the fact the Kiwi’s wanted all their equipment Serviceable before departure as they said things were much tighter back home.

*(Watching a very BER wreck of a 2 ½ ton International truck issued to the Kiwi’s blown up instead of being repaired brought joy to my heart and a scramble to take cover under an M113 APC as the 4RAR/NZ Assault Pioneers used up all their surplus explosives, with truck parts scattered over more than 1,500 m radius – Very naughty and brought a reprimand from HQ 1 ATF.)*<sup>1</sup>

### **The Problem with the Guns**

In March 1971 the Officer Commanding (OC) of 106 Fd Wksp (the late then MAJ John Sinclair) returned from a 1 ATF Commander’s Conference with urgent orders - apparently the Commanding Officer (CO) 12 Fd Regt RAA (the late then LTCOL Bruce Topfer) had advised the COMD 1 ATF that his regiment could no longer fire “Danger Close” missions safely (first round no closer than 1,000m to leading elements of ground troops) because of the poor state of his guns. The OC of 106 told me that the COMD 1 ATF had directed that the workshop was to attend to the guns as a top priority and I was to undertake a quick inspection to scope the problem.

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<sup>1</sup> There was a lot more equipment that should have been scrapped instead of preserved and shipped home. e.g. on return to Australia at 3Base Wksp I was faced with over 20 seized VW powered generators (obviously ran out of oil!) that had been preserved and shipped home to be condemned BER and sent to auction.

I found the Vietnamese tradesmen at 102 Fd Wksp stripping paint and rust from hand tools and wooden benches so they could be painted and returned to Australia was too much. A telephone call to MAJ Pat Ferguson at HQ AFV soon got us some technical direction on what equipment/stores should be preserved and returned to Australia.

I, with SGT John Loch (Artificer Gun) in tow, proceeded to the 12 Fd Regt gun positions and quickly looked over the troop of guns that was available. There was no need to strip anything to determine serviceability - when you could lift the gun muzzle 60 mm and rock it left and right 75 mm it was obvious that the wear was in excess of the EMEI limits and firing inaccuracy would result. With the gunners' approval we took one gun back to the workshop for more detailed inspection. We showed the OC the obvious wear.

More detailed inspection of the gun showed that the wear was through all systems of the gun with :

- solidified grease and water in the wheel bearings,
- axle shafts hammered oval
- grit and water in gear boxes, and
- grit and dust within the recoil slides etc.

Later discussion with the Fd Regt Light Aid Detachment (LAD) brought the comment that regimental officers complained if grease was oozing out of slides etc "as it collected dust". They obviously didn't understand that regular greasing forced the dust and water out.

This all indicated a lack of operator maintenance, but just as worrying, a failure by the EME system to provide the necessary technical inspection and advice to the users. John Sinclair later advised me that the proposed in-country Equipment Inspection Service (EIS) manpower had been used for the establishment of 106 Fd Wksp and consequently the function was never implemented.<sup>2</sup>

Just prior to my posting to SVN, I undertook an "Officers' Small Arms Repair Course" at the RAEME Training Centre (RTC). It was quickly arranged because of continuing serviceability problems with small arms in SVN; the condition of the guns indicated that these problems obviously extended to more than just small arms.

### **Determining the Extent of the Problem and the Capacity of 106 to Rebuild**

In early April we continued on with the inspection of the guns and found that they were all nearly in the same condition. The two reserve guns from the 2<sup>nd</sup> Advanced Ordnance Depot (2AOD) located in Vung Tau were in similar, if not worse, condition and were unfit for issue. Why these guns had never been returned to Australia earlier for overhaul I never found out. We were informed by John Sinclair that replacement guns were not available from Australia as there were severe serviceability problems with guns in Australia because of a lack of key parts. The US Army had apparently also advised Headquarters Australian Force Vietnam (HQ AFV) that they had no guns available but, as US M2A2s had been declared obsolete, Australia could source whatever spares they had.

(Only later were we to discover that a quantity of obsolete self-propelled (tracked) M2A2s were held in the US Long Binh Stores Depot; the US computer system didn't report this because of their obsolete status.<sup>3</sup>)

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<sup>2</sup> My career has taught me that the old EME saying of "you f...! it and we fix it" can have bad results for RAEME if our members (all ranks too!) forget that a most important EME function is Technical Advice. If a user wishes to degrade equipment by overloading etc it then it is his responsibility but!! he must be made aware of the implications of his decision and we have that responsibility. Once having to sign off on the conversion of a million dollar plus lightweight aluminium bridge from an operational asset to a training aid (because of poor user maintenance) brought that home to me (and particularly to the owner CO!).

<sup>3</sup> Obtaining volunteers for a bartering trip to the US Long Binh Depot (28 km perimeter) was not a problem as personal trading could also be conducted. We set off after being amply supplied by the QM with GP Boots; Socks; Slouch Hats; Camouflage Raincoats and slabs of Aussie Beer paid for by ourselves. Being an honest officer and not wishing to get too involved in my soldiers sometimes dubious activities; I stayed with our hosts, the US Maintenance Coy in case higher rank help was needed to get one of our guys out of trouble. We left for the trip home with lots of gun parts; tyres for our M543 Wreckers (supposedly none in depot) etc and stopped outside the depot after the US MP's checked us through. SGT Tony Tratt RAAOC (Driving) stopped the stores truck complaining of a lack of power and found that he had a "borrowed" 1 Ton US trailer on tow because the diggers couldn't fit any more stores on the truck. We also had the offer of an M2A2 SP Gun for our perimeter defence but John Sinclair didn't think our neighbours or HQ 1ATF would approve.

The pressure was then on RAEME and RAAOC to find a solution quickly. After quick detailed inspection of one gun and confirmatory inspection of several others I reported to John Sinclair that we could overhaul the guns provided parts were available and that the problem of machining the long recoil slides could be solved (brass strips riveted onto the cradle and then machined to suit the barrel/recoil sleigh). One item that was critical was the axle assemblies; the stub axles (maintainable item) were shrunk and welded into the axle trees and we had no means of replacing the stub axle or repairing the ovality. As it turned out, the US system had stocks of axle assemblies allowing the worn items to be returned to Australia as Repairable.

102 Fd Wksp at Vung Tau was contacted and asked to investigate machining options as we believed that the helicopter repair ship USS Corpus Christi had a heavy machining capability. This turned out not to be an option; however 102 Fd Wksp found that the US Air Base in Vung Tau had a large milling machine and the workshop could access it "after-hours". The US machine didn't have the required bed length so the workshop developed a "work-around" by machining the lengths in two serial operations and then hand finishing the strips with body files to suit the particular cradle.

I was asked to develop a rebuild project, including an estimate of the duration and manpower required. This I did. John Sinclair took up the options with HQ 1ATF, HQ AFV, MGO Branch and DEME (technical elements in Melbourne). From what I understood at the time, the concerns that Australian based experts had regarding 106's ability to carry out the project didn't seem to worry the COMD 1 ATF as Australia couldn't do anything about replacing/repairing his guns and there was an urgent need to regain accurate gunfire support. The COMD 1ATF's confidence in his workshop was edifying to us but also very worrying because of the technical concerns we had.

John Sinclair questioned me very thoroughly on how we would carry out the project. I identified the risk areas and explained how we intended to overcome them and what support we would need from stores supply and 102 Fd Wksp even though they initially seemed reluctant to take on the machining task.

I was very aware then from conversations with John Sinclair that MGO Branch and DEME were very concerned that 106 Fd Wksp were not capable of undertaking a base repair level type project but the ADEME and ADOS from HQ AFV had visited us and offered all the support possible. John Sinclair then advised the COMD 1 ATF 106 could do the project. In later years I was to find out that John's decision clearly put his career on the line as he received a "please explain" from MGO Branch where apparently it was not believed that a Fd Wksp could succeed where our Base workshops had failed.

*In coming to my advice that we could undertake the project, not only was I supported by some good artificers and tradesmen, the in-country RAAOC stores officers (the OC of the Wksp Stores Section LT Tony Stafford was a 17th intake Army Apprentice) and NCO's that chased up parts listed and not-listed in the US stores system but also by the excellent and broad based training that I received on the Junior Officers' Course at the RAEME Training Centre - We spent twelve months there after leaving OCS Portsea spending time in each training Wing under the tutelage of experienced WO and SGT instructors who saw it as their privileged duty to guide us 2LT 'upstarts' in the ways of the technical world. It was there that we partially stripped guns such as the M2A2 and learnt about their characteristics and problems. Such knowledge and experience allowed us in later years to converse with and gain the confidence of our Artificers. I pity the young officers of the modern era who don't get such a valuable introduction to the technical world of RAEME.*

## Proceeding with the Rebuild

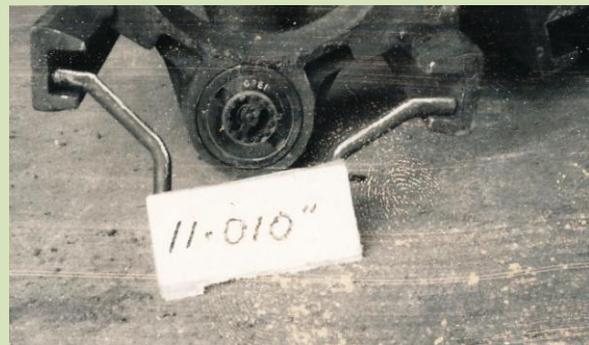
The COMD 1 ATF, with agreement from HQ AFV, ordered the workshop to overhaul 12 Fd Regt's guns and gave us fifty days to do it. With the withdrawal of the New Zealand 161 Fd Battery we had a pool of guns to draw on in mid-April which allowed 12 Fd Regt to continue providing fire support to the Task Force. At about this time gun tools and the majority of the initial order of repair parts had arrived.

The two guns from 2AOD Vung Tau were delivered to the workshop to start the project and stripping began. We were offered additional manpower if we needed it but I rejected this based on initial planning; except for WO2 John "Tex" Ritters (Armourer HQ 1ATF, ex 4 Fd Regt RAA) as a valued adviser on technical aspects.

He was very helpful in the design of gauges for the fitting of the brass recoil slides.



Gauge Minimum Cradle Width



Gauge Sleigh Width



Gauge Maximum Sleigh Rail Depth

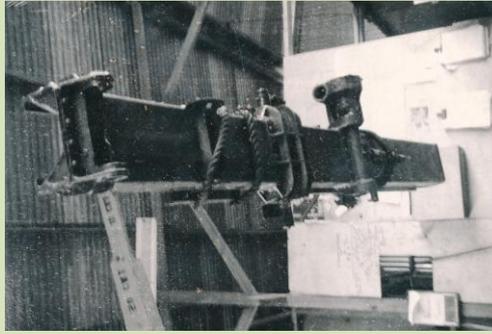


Cradle Brg Strip Gauge

As we progressed with the project and stripped more guns we identified more work to be done. We discovered more parts needed to be replaced and therefore started to run the supply system out of parts. This meant more bushes etc needed to be manufactured and therefore acquiring phosphor-bronze stock became a priority. This became a problem in our remote location and so, after some textbook research, several bushes were manufactured in brass and the Gun History Books annotated for these guns to have regular inspections and the bushes replaced with the correct specification items when they became available.

Not only was the gun rebuild team working long hours - six and a half days per week - but the 106 unit lathe was working each night until the RAE power generator shut down at 2200 hrs.

The cradle bearing strips machining method and the hand finishing gave rise to some very tight cradle/sleigh fits as stresses released during transport of matched cradles & sleighs by truck from Vung Tau to Nui Dat.



M2A2 Cradle for Transporting to 102 Fd Wksp Vung Tau

I was faced with a decision on one very tight fit on a gun urgently needed (we believed that this may have been due to irregularities in the compression of the individual rivets (done by hand) but this couldn't be proved). After pulling back the ordnance by hand (several times I remember) and checking the run-out, the gun was released to the gunners with the recommendation to fire the first round on charge one under EME supervision and regrease the slides between the first few rounds. All went well and the gun was back in action.



M2A2 Ready for delivery



Minister for Army Andrew Peacock speaking to CPL Bob Bradford.

## Gun Performance

We delivered the first battery's worth of guns and then a gunner's problem arose; they were trying to "calibrate" the guns using the "fall-of-shot" method but were having no success.<sup>4</sup>

An offer of RAEME assistance was rejected and the loan of a velocity measuring Doppler radar and operator from the US Army was arranged by the gunners. This equipment failed when deployed and we suspected internal connection problems but the US wouldn't allow our electronics' tradesmen to touch the system so it was returned.

An urgent request went to Australia for the very new EVA (Electronic Velocity Analyser) equipment. It arrived with an EVA team of 2LT Tony Ayerbe, SGT Keith Ayliffe and BDR Mick Kinang. The electronic measurements appeared to go OK, including some measurements taken on guns at a Fire Support Base (FSB), but the conversion of these velocity measurements to gun correction factors posed some problems that had to be solved by the EVA team.

I was present when the resident Nui Dat gun battery fired its first battery salvo to check the correlation of the individual guns' impact points. The target was 8,000 m out with a Forward Observer (FO) in a 161 Recce Flt helicopter undertaking visual fall of shot performance. When the FO returned I questioned him as to the results and he told me that there was a problem; the entire battery's rounds had impacted in a 25 metre circle which he said was too tight! I informed him that this was now an Artillery problem not a RAEME problem.

<sup>4</sup> For a given charge and shell, each individual gun will have a different muzzle velocity due to machining tolerances and wear. If the individual muzzle velocities are known then corrections can be calculated for each gun.

It is interesting now at this late date to read the history of the “104<sup>th</sup> Fd Bty RAA VIETNAM 1968 – 1969 and 1971”<sup>5</sup> to read:

*“During this tour (1971) the infantrymen of 4RAR/NZ came to have such confidence in the 104<sup>th</sup> Field Battery that the Task Force Standing Order, stating that the 1<sup>st</sup> round of a Fire Mission had to be directed 1,000m in front of the leading elements, was waived for the first time. And, as a mark of affection, the infantrymen of 4RAR/NZ began to refer to the battery as “104 Company”.”*

We knew that the guns were performing well but I do not recall us ever getting such superlative feedback whilst in SVN. Certainly the COMD 1ATF was pleased and so was the CO 12 Fd Regt LTCOL Topfer.

We did get some feedback from the 12 Fd Regt LAD; after the rebuild, LTCOL Topfer had assembled his Gun Sergeants and gave them a lecture on the maintenance of ‘his’ guns with words to the effect that he would have new Gun Sergeants if they failed to heed the advice of their Gun Fitters. Much appreciated by the LAD and 106 Fd Wksp!

## Wrapping Up

The project concluded later than the fifty days allocated by the COMD 1ATF but 106 Fd Wksp delivered sixteen guns (sufficient for the Regiment) by the end of June 1971 and the remaining six guns on 17 July. There was a break in production in late June/early July caused by lack of parts. The two key elements in the rate of output of the guns were the availability of cradles from 102 Fd Wksp (with new brass sliding strips fitted) and the supply of repair parts.

The rebuilt guns were delivered with worn barrels, but all were within specified tolerances. Nearly every other sub-system was rebuilt to original specifications. The guns were repainted and, as per EMEIs, a brass plate was affixed to each gun detailing the rebuild by 106 Fd Wksp.



Last rebuilt M2A2 being prepared for delivery

In about mid 2008 I received a phone call regarding research into the guns defending FSB Coral where one gun was overrun by the enemy and one had been hit by enemy fire and the recoil system damaged. The research had revealed these brass plates on the guns suspected of being at FSB Coral and it was thought that the rebuild was associated directly with the FSB Coral action.

<sup>5</sup> [http://12fieldregiment.com/history\\_104fdbty.htm](http://12fieldregiment.com/history_104fdbty.htm)

I was able to tell the researcher that, although the rapid firing at FSB Coral would have contributed to the need for rebuild, the rebuild did occur much later than 1968. One of these FSB Coral guns now stands at the School of Artillery Bridges Barracks Puckapunyal and another at the Australian War Memorial in Canberra.

### References

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- AF C2119 Commanders Diary, 106 Fd Wksp RAEME. 1 Apr 71 to 30 Apr 71
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- AF C2119 Commanders Diary, 106 Fd Wksp RAEME. 1 Jun 71 to 30 Jun 71
- History: 104<sup>th</sup> Field Battery, RAA, Vietnam 1968 -1969 & 1971 ([http://12fieldregiment.com.history\\_104fdbty.htm](http://12fieldregiment.com.history_104fdbty.htm))
- Email: John Sinclair/David Miller, 29 Aug 2006, 3:04 PM, Re: "Back to the Heartland".
- National Archives of Australia: Series Details AWM298

### MEMBERS INVOLVED

#### 106 Fd Wksp RAEME

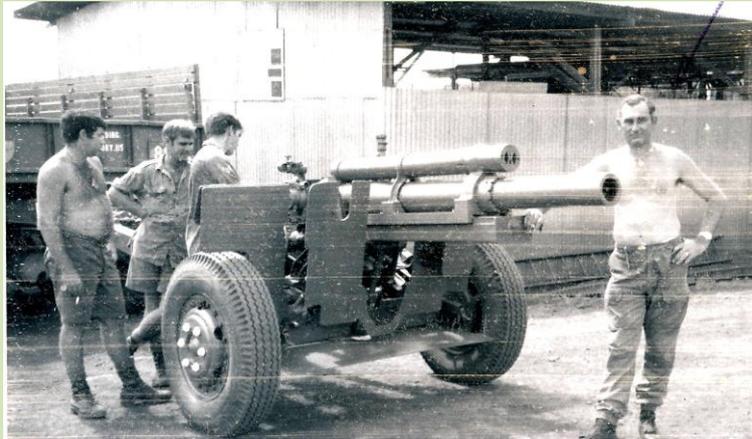
- MAJ John Sinclair OC 106 Fd Wksp (RMC 1956)
- CAPT David Miller OC GE Pl (11<sup>th</sup> Intake Electrical Mechanic/Fitter, Appschool)
- LT Tony Stafford OC Stores Section RAAOC (17<sup>th</sup> Intake Fitter & Turner, Appschool)
- WO2 Matt Tynan, Art Armt (1<sup>st</sup> Intake Fitter & Turner Appschool)
- SGT John Loch , Art Armt (20<sup>th</sup> Intake Fitter & Turner Appschool)
- CPL Patrick Harris, Armourer (20<sup>th</sup> Intake Fitter & Turner Appschool)
- CPL Noel Newton, Armourer (20<sup>th</sup> Intake Fitter & Turner Appschool)
- CPL Robert Bradford, Armourer (Adult Trades, RTC 1966/67)
- CFN Richard (Sledge) Ammer, Armt Fitter (National Serviceman)
- CFN Brian Carter, Armt Fitter (National Serviceman)
- CFN Kevin Cuneo, Armt Fitter (National Serviceman)
- CFN John Kimberley, Armt Fitter (National Serviceman)
- CFN Jeff (Rembrandt) Costello, Painter (National Serviceman)



The last of 16 105 mm M2A2 Howitzers ready for delivery to 12 Fd Regt RAA pictured with the rebuild team June 1971. Soldiers L to R. CFN Brian Carter, CFN Richard (Sledge) Ammer, WO2 Matt Tynan, CPL Pat Harris; CAPT David Miller, CPL Bob Bradford. Squatting, CFN John Kimberley. Missing: SGT John Loch, CPL Noel Newton, and CFN Kevin Cuneo. Photo by CAPT David Miller.

**HQ 1 ATF**

- WO2 John (Tex) Ritters, Art Armt, (Civilian Apprenticeship)



WO2 John (Tex) Ritters (Foreground) with rebuilt gun and some team members