

Senate Standing Committees on Economics
PO Box 6100
Parliament House
Canberra ACT 2600

Dear Senate Standing Committee on Economics.

27 August 2021

I did my homework before writing this submission to you the committee and quickly realised that none of you were even born when I embarked upon my lifetime devotion to quality and excellence in manufacture in this country. Sadly, both sides of the political divide have allowed the disintegration of the once very active manufacturing industry we had. Please do not insult my intelligence by suggesting we made inferior products compared to overseas imports. We manufactured world class products and the work was done with pride. I don't know where to slot the items of the TOR (Terms of Reference) into this but many of my points will fit into some of those multiple times. I do not expect you to understand the technical details I will mention but you NEED to know. At TOR point 7. 6 it will be obvious for you. Others not quite as obvious. Because 20 years of my life was spent teaching skills (which unfortunately you just cannot package and give to a learner) 7.6 is easy.

I will briefly qualify why my input should be heard. I understand very well how this sector of the economy works having spent 5 years learning my trade as an indentured apprentice (not the discounted 3 year attempts that occur these days), then doing post trade (toolmaking and welding). Working in the production on many of the processes including highly specialised operations such as gear cutting (all varieties, spur, helical, spiral, worm (parallel as well as hourglass), worm wheels and straight cut bevel gears along with involute splines on hobs, gear shapers and Gleason Bevel Generators. This included the broaching of keyways and/or splines (both parallel and helical) in the bores of the gears) on push and pull type broaching machines, precision grinding to tolerances of 0.0001" using Surface Grinders with every spindle/table configuration and every type of material including 'Bi-Metal' where 2 different types of material fused together, typically gunmetal and hardened steel would be ground (problems with two different coefficients of expansion causing difficulties with flatness), then hardened tool steel form surface grinding using specially dressed wheels with micrometer radius dresser, angle dressers and then checked with optical comparitors. (The orange pencils with the dark brown ends that you have most likely used called 'Copperplate' were produced on these set ups or at least the cutters were. Those corner radii on the hex were held to a tolerance of 0.002"). Then worked with Internal Grinders from sizematics through to plain and every conceivable type of material including all ferrous, both hard and soft (B scale and C scale Rockwell Hardness), Tungsten Carbide, Titanium, Boron Carbide as well as ceramics. Using Cylindrical Grinders both Plain and also retracting angle wheel head configurations and also grinding chilled iron rollers and rubber rollers in their own bearings. I have also used Centreless Grinders with both plunge and through processes. I have used lathes of all configurations and sizes along with milling machines. These were some of my duties and my experience is broad. I also had to do hand work as well (Fitting) and was involved in the full restoration of a lathe and gear grinder back to new condition. My day to day hands on experience including my Indenture Period was 14 years. This also included 18 months in Inspection/Quality Control with fine measurement on coordinate measuring machines. I was required to do formal qualifications for these activities.

I began teaching my trade in January 1978 (the year you were born Anthony Chisholm) and did my formal studies for teaching in parallel with my face to face classes. This amounted to 100+ hours per week in the first 2 years. Teachers in TAFE then had to have formal teaching qualifications and I

gained my Diploma of Teaching (Technical) in 1981. In either 1980 or 1981 (memory not so good on the timing) we had a delegation from Canberra come to our college (St. George College of TAFE) and it was headed up by Barry Jones the then Labor Science and Technology Minister. Our entire faculty was encouraged to see Barry and speak to him and we went as a block to what used to be the Library but now is an Administration Block. I vividly remember the content from this discussion when Barry Jones stated that conventional trades would be taught very differently in future times. Barry Jones stressed upon all of us that there was already a chronic shortage of skilled workers in every trade and that the make or break year was foreseen to be 2005. We then passed the point of no return by 2005 and we STILL have done nothing about it. Both sides of politics guilty as charged. Remember that it was either 1980 or 81 that Barry Jones made these alarming statements and you need to be reminded of that.

Now some issues that must be addressed...A colleague of mine and I have written syllabus support material for the 8264 course that used to be taught in NSW. I, along with others, have written module material for the National Broad Based Curriculum and that material was used across all of Australia. At least one of the publications with my name on it is still for sale and is still used. I challenge any of you to debate me on this manufacture topic because you will very quickly realise just how much you don't know, (you might 'think' you know) or you actually didn't realise the implications. I am not being disingenuous to you, it is just how it is.

The biggest problem we face is finding suitable skilled employees. This is the cry I hear all the time from ex-students (whom I remain in contact with). These dedicated people run very high end engineering manufacture and they produce fine toleranced components for many major companies, government, military and one is even exporting to China. Do you realise what that means? If you export to China it means they do not know how the processes are done otherwise they would do them themselves. You would have unknowingly used something these companies make AND it was made here in Australia. One of my ex-students said he would prefer to sell a machine rather than let one of his skilled workers go. That is how important they are BUT because of the inaction in previous years, the continuity of keeping a continual top up of skilled operators has fallen to the point that all of the current skill base is over 50 years of age and people like myself with highly developed psycho-motor skills (and although there is still a cohort now in retirement) are almost non-existent in the current pool to draw from. Those of us who possess these skills will take them to the grave...me very shortly. The skills once gone are lost forever. Much of the knowledge is not written in books. I find it criminally negligent that the text books that underpin the backbone of Fitting and Machining and Toolmaking have had the masters 'lost' or destroyed. I know personally all of the authors of the those lost text books and I still have full sets of both Imperial and Metric editions. Something that my son's University Engineering Professor at USyd would kill for. He was impressed that he had one book from one of the sets and said it was 'like gold'. Well there are 7 of them in the entire set and one volume for Toolmaking. (Incidentally we still need to work in Imperial although it is no longer taught).

When I began my teaching career the mantra was 'TAFE is here to SUPPLEMENT industry's training'. As time went by this was slightly modified but the implication was massive when the mantra 'TAFE is here to train FOR industry'. This means that a partial abdication of responsibility of industry to train its workforce and put the onus on TAFE. Now, and this has been like this a number of years, 'TAFE is here to train industry'. In other words a total abdication on the part of industry to totally put the onus on TAFE and totally butcher tried and true standardised proven courses in favour of totally individualised courses that cannot be compared against. From an employer's perspective I would not

like to get a prospective employee where there was no measurable or comparable standard. There are no longer any standard syllabus documents and no commonality across States . Arguably, not even regions. This is a total disgrace. It makes me sad and extremely angry. I do not want to see what I worked for and put into this country squandered by idiotic decisions and ideology.

The Howard era and the 50% self funding of TAFE debacle. When will you people realise that vocational education is an investment in the future? Why do you see it as a direct cost NOW? I happened to be teaching Computer Aided Design (CAD) in the 1990's when this started to have adverse affects on students. I bring this up because manufacture begins at the design phase and CAD is high technology and at this time it was a steep learning curve to master. It was possible to do the introductory CAD certificate through TAFE, prior to this Howard directive, with 7 modules from the 7771 course for \$188.00 for 2 semesters. It was totally possible because in Semester 2 you could enrol on multiple nights to fit in the required modules. Now, one of my students came to me distraught because he had just lost his job as he had been retrenched. He was unfortunate to have missed the token position in the one normal \$188.00 fee TAFE course and was forced to do the TAFE PLUS Fee For Service course. Same material just at a premium price. The first and prerequisite module was \$550.00 and the others were all dearer. Now it does not take much mathematics to figure that even if all the modules were \$500.00 then 7 of them would be \$3500.00 and he is held to ransom because he CANNOT get another job unless he shows his certificate. He was still paying a mortgage with no income and then a monetary slug for fee for service education. Do you think that this situation is OK because I certainly do not? I helped him in my own time (at my own expense) to ensure he passed. When you read this just know I have never forgotten him and how insensitive the Howard edict was and I realised that the Federal Government cared little about the real welfare for people just trying to keep up their skills. It was all about the bottom line and make sure TAFE makes a profit. Are you hearing this?

For manufacture to successfully restart this country needs the following :-

- a) A National Development Bank controlled by the Government and used for innovative processes. NOT derivative trading and other get rich schemes that can be subverted by those with the propensity to do that sort of thing.
- b) We need a source of cheap power NOT OIL OR GAS POWER but something along the lines of low temperature nuclear or molten salt. The prohibitive current cost of power kills our competitive edge. Check into Thorium reactors for low temperature low pressure and safer forms of nuclear and massive solar arrays with large scale battery storage. Coal is DEAD. I understand that does not suit the LNP narrative but I am right and the science bears it out. You could also look at large scale hydrogen production from ammonia set up in arid parts of the country using large scale solar arrays fixed above the ground so that the land actually cools and allows grasses to grow underneath. There is plenty of room for innovation here in this power sector and many perceived jobs.
- c) We need a continual supply of well trained employees. This assumes they have been vetted for their aptitude and even temperament, also that they meet the stringent criteria required to work in dedicated teams. You cannot let rogues loose on very expensive equipment. It is crucial that these people can take instructions and carry out their duties to the letter. Prangs are horrendously expensive and they can be brutal to both the operator and the machine. Remember machines cannot hear you when you are screaming.
- d) TAFE needs to revert back to the standardisation of syllabus. This is something it does not have

now. Also that Industry MUST bear part of the training cost for all new employees. TAFE MUST be affordable.

Remember that for manufacture to happen then remuneration for those who make it happen must enjoy some of the spoils of their success. It is impossible that a new employee put up his/her hand to do highly technical, highly responsible, very stressful and brain draining work and be required to carry the amount of knowledge required to then see that others are sitting at home doing nothing and those sitting at home are taking home a sizeable amount of what the employee takes home with no responsibility.

e) Shiny new factories, brand new plant and equipment WILL NOT restart manufacture unless A B C and D are in place first.

f) Supply Chains must be fixed. Currently we cannot even get the full range of bar stock in either sizes or grades. It is impossible to be competitive if we need to machine to finished size of Diameter 16mm when originally Diameter 16mm could be purchased directly off the rack, but now needs to be machined down from Diameter 20mm. This is an example only. (We place Diameter before the size, it is NOT a mistake and it is normally shown as a circle with a 45 degree line through it). We no longer make non ferrous noble metals such as copper (Beryllium Copper), brasses, bronzes, gunmetal etc. Neither do we produce the specialist stainless steels in the 300 class and 4000 class. We no longer make any of the states of Stainless Steel (Austenitic, Martensitic and Ferritic) in this country. FYI the thickness of the passive layer on the stainless determines the corrosion resistance of the steel. Yes we have raw materials here but why are we not value adding here rather than having to import finished materials from overseas at a premium price from our raw materials sourced from Australia?

Tell me why it is cheaper to purchase finished components from countries like India for less than it costs to buy unmachined bar stock in Australia? Where is the level playing field? It sure is not in this country. We have to survive with a government hostile toward us it appears. Why is it that even Government will not preference Australian Made over imports?

The really worrying part I see is that IF (and God help us if we do) have a skirmish on our island continent. We now are on the precipice of having gone past our time where our capacity will pull us through. This is NOT like it was when we needed labour in WW2. We actually had a skilled labour pool back then and people who could be relied upon to train a workforce in a hurry. WE DO NOT HAVE THAT SITUATION NOW. ALL old guys like me almost ready to fly the coop. I can see the finish line in clear sight. We still have the muscle memory to do this sort of work, but probably not the resilience. You will realise it when we are in the same situation as Britain was in during the Thatcher years. One of my friends was teaching there and it was a disaster and our time is coming.

We do not refine fuel in this country...economics put paid to that and now we get it from Singapore. Good luck with that if they shut down the South China Sea. Remember that we need maintenance fitters to keep the manufacturing and the ancillaries running and it all fits together like a jig-saw.

A big wake up call.....22 Days of petrol supply in this country... Don't say you were not warned or this was not foreseen.

We have world class operators in world class high end shops and all of them are doing it tough. As a government you should be proactive and reach out to these companies. I will be only too glad to act as an intermediate contact with them and pass along any information to the companies, especially two of them.

We have some really innovative people in this country but the government appears to have shut up shop on them and R&D appears to be lip service with no substance behind it. Sorry for being sceptical but that is how it appears.

I am going to end on this note...we are talking VERY precise operations that are capable if you have the expertise of the operators and the equipment that will do it. These tolerances are inconceivable to you but we can do this all day every day. Imagine slicing a human hair longitudinally 50 times well that is what we can do. 1 Micron or 1/1000th of a millimetre (0.001mm). That capability is now essential to possess. Mugs and the untrained or partially trained just cannot do it. What I have been talking about is CNC Machining which means Computer Numerical Control with anti-backlash ball screws and nuts to position the cutters.

There is so much more but I am getting angrier and more disillusioned. I did not include other sectors of our manufacture that we once did and are still required with metal pressure die casting, plastic moulding and the associated ancilliary processes of die manufacture EDM, wire cutters along with press tools for our now defunct whitegoods production that are integral to the smooth running of this part of industry. We had an opening to produce electric vehicles when Holden was mothballed. We had specialist teams that could have easily re-tooled for production but we are too dumb in this country to see a golden opportunity when it smacks them in the face. Maybe it is about time that this government seizes the opportunity and gets affordable electric vehicles to the masses which would be a win win for all and massive qudos for being forward thinking?

I am aligned to no political party and have a healthy distrust of all politicians. Sorry about that but you need to know where I stand. I hope you find what I have presented as interesting and I am only too glad to elaborate on any or all of what I have written. I am still impassioned with and fascinated by engineering, along with all of its processes, its conformance to the Laws of Physics. I still keep in contact with many of my ex-students and they know that once a student of mine then I will always be there (while I am still here) to support them if they need me to be. I also still keep my hand in with CAD and still answer curly questions thrown at me by ex-students. I also did not cover the privatisation of skills training but that is another full document for another time. I hope this has also been informative for you and that you learned something new.

Thank you for reading my submission.

Best Regards,

Alan Baker
