SOCIETY OF AUTOMOTIVE ENGINEERS AUSTRALASIA

SUBMISSION TO THE 2002 PRODUCTIVITY COMMISSION

REVIEW OF AUTOMOTIVE ASSISTANCE

Introduction

SAE-A and its focus

The Society of Automotive Engineers Australasia represents professional Automotive Engineers and Technicians across the spectrum of the industry. This implies membership from manufacturing through to fuel supply, service and road maintenance. The Society is in its 75th year and has had as its objectives the maintenance of the highest professional engineering standards in both engineering practice and qualification of its members. Other objectives include:

- the advancement of the Australasian automotive profession in developing and delivering mobility to the community
- to recognise and reward excellence
- to promote Automotive Technology to all levels of the community
- to facilitate the exchange of ideas between members and the community in general
- to assist the Australian automotive profession in the employment of capable technical personnel
- to increase the confidence of the general community and the profession in the employment of persons by admitting them to respective grades of membership (which includes technician as well as degree qualified members).

The Present Inquiry

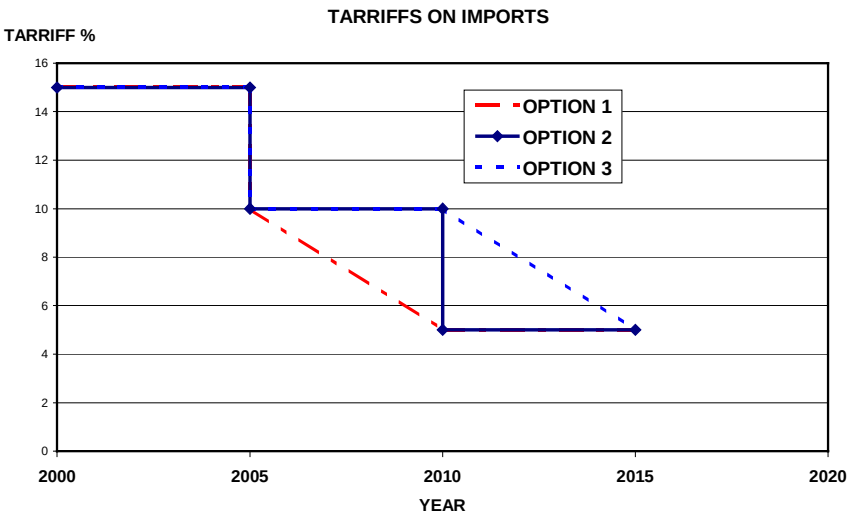

Figure 1 Options for reducing passenger vehicle tarriffs

The SAE-A has considered the three options presented in the 'Position paper' of the Commission as described by Figure 1. We understand the Commission sees benefits of option 2 and the continuation of ACIS after 2005 as a means of facilitating reduction in the tariff to 5 per cent. Three approaches to support have been considered as in figure 2, which includes the present 2000 –1005 support.

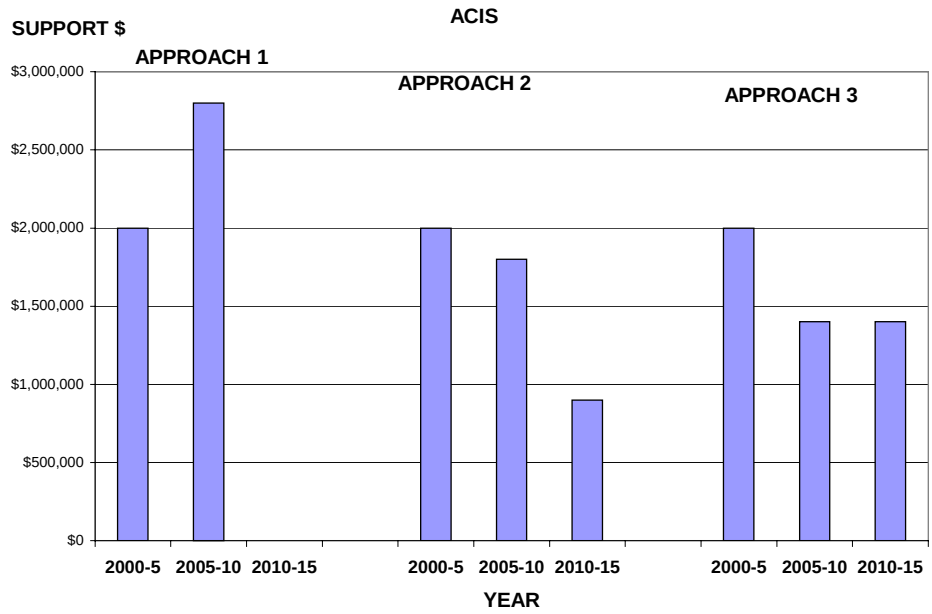

Figure 2. Possible approached for ACIS support.

SAE-As response to this position is formed from the following observations.

Impacts on the Industry in the Post Button Plan period.

Over the period of the last three Inquiries, Automotive Engineering has grown substantially in terms of quantity and quality. In order to maintain this improvement it is essential to further harness concurrent engineering, which involves the integration of design and manufacture. This is even more essential than in the past since much of the car is produced by component suppliers today and therefore entails close cooperation between the manufacturers and their vendors including the research and development phase being undertaken in harmony between the partners.

When design is undertaken offshore this cooperation is much more difficult unless the Australian vendor has facilities close to the manufacturer overseas. A status obtained by a number of tier one manufacturers from this country. Even when design is undertaken at a distance using modern communications technology, there is no substitute for the personal (good) interface.

Outside Europe, North America and Japan only in Brazil and Australia is there is considerable integration of design and manufacturing, involving local suppliers to a considerable extent. The Society argues that Automotive Engineering is a cornerstone of other engineering operations and related activity in Australia. The Commission has recognized that Automotive Engineering supports the general manufacturing base and the Society believes that our industry plays a tangible role in

providing modern engineering practice for engineering education and training, in addition to influencing the availability of expertise which flows through to other enterprises that entail advanced manufacturing processes. This is not only evident in the diffusion of technology but also in personnel trained for and in the motor industry who migrate to other industries.

Further we argue that the existence of a local industry with a design base has enabled better outcomes in terms of response to environmental requirements related to safety, air quality and energy efficiencies.

Professional Engineering Skill Base Built on Long Term Needs

Currently there are around 3,500 engineers and 7,500 technicians persons employed in the automotive industry in production related positions. In addition there are those identified in the Commission's Position Paper related to support and service roles bringing the total to about 55,000. Pursuing a program of accelerated reduction in tariff support could easily jeopardise these jobs and lead to the transfer of production overseas. Likely the loss of local facilities would lead to accelerating the 'brain drain' of Australia's skilled employees.
The Society's experience indicates that in order to have an adequate technical base, with a wide range of experience and knowledge needed for vehicles and component production to be maintained at design and quality for the world markets, there needs to be a quantum size of engineering skills. With the focus of the Australian vehicle industry being positioned on one model size, the upper medium sector, the situation we judge to be quite critical if further contraction of the engineering base occurs as a result of the changes in tariffs proposed.
A particularly important achievement is the relationship between vehicle design and service industry. The local OEMs put considerable emphasis on the study of their vehicle's performance in service, particularly related to the costs of accident repair, which often for the upper medium sector is considerably less than for smaller imported cars. The survival, and indeed propagation of this concept is an important part of overall minimizing the operating costs of vehicles to the community, which needs to be accounted for in the economics. We suspect the maintenance of the quantum size of engineering skills as a variable has not been included in the economic modeling, even though the MONASH model might have this capability.

Education, Training and Design Expertise

Tertiary students see the function, operation and aesthetics of cars as prime examples of Australian engineering expertise. This is in the absence of an identifiable aerospace industry that might form a role model for students in the US and part of Europe. As a result of the pressures for improved engineering brought about by previous tariff reductions, new educational courses, emphasizing engineering design, economics and statistics, and also production methods and cost control have been developed by universities and colleges. The lead time required for new graduates to infiltrate the industry is at least 7 years from the time of inception of changes. This is because the lead time for curriculum change, the time for participation time before graduates merge from the changed course and the two or three years for graduates to move into positions where they can fully exercise their training. Thus developments brought about by the last Industry Commission report (number 58 in 1997) are still yet to be felt in the Automotive Industry. A sudden change in direction could

produce graduates and technicians not required by the industry if there is a loss of opportunity for employment in this sector.

Delivery of high value added production volumes in the automotive industry has been reported in the Position Paper. Over the last decade there has been a significant increase in the value of automotive exports. It is a well proven experience that most car exporters around the world rely on a considerable domestic volume to support their export activity. To our knowledge there is no country in the world where a substantial export market exists without this support. In Australia we have the added advantage of a good minerals and energy resource base which can be harnessed to add value throughout the production chain so that our exports generate further employment and business opportunities not only because of the final technology but because all of the supply chain can be indigenous. However volume is an imperative in order to ensure success. This is not to deny that some local manufacturers have been able to exploit niche opportunities for their products. For example PBR (PGT), Bosch, Air International and Hella who already successfully compete in the global market place on the basis of price, quality and delivery. Holden's ability to seize the opportunity of local production of the Monaro as an export vehicle is a prime example of meeting a niche demand in supplying the Pontiac GTO to the US in the near future.

Quality Considerations

Approximately 70% of the manufactured value of a motor vehicle is that purchased from component producers. The best vehicle assembly practice cannot achieve quality performance without equivalent performance from its component supplier. Therefore, without an operational indigenous automotive industry component suppliers cannot fully participate in the simultaneous engineering processes of providing design capability and knowledge of quality performance practices to fully achieve the desired integrated design. That is not only does delivery need to be 'Just in Time' with Six Sigma quality but the production process needs to be aligned with the manufacturers' requirements for production flexibility as well as quality from job one.

Recognition of Engineers in Society

The Automotive Industry is the most technologically advanced engineering activity in Australia with respect to large volume production. The challenges of topics such as robotics, ergonomics, environmental engineering, bio-engineering and energy conversion would not hold such a prominent place if it were not due to the need for understanding and developing skills in these areas to meet the Automotive Industry's requirements. The flow on effects to other manufacturing areas of the up take by the non automotive sector of these new technologies has not been quantified but is clearly a significant factor for maintaining and growing our local industry.

The Society is committed to raising technical expertise, technical standards and leadership amongst the automotive engineering fraternity with the objective of maintaining our engineering standards at an excellent level, to encourage a competitive position in the global automotive market place.

New Opportunities

In submissions to previous enquiries the Society has focused on the need for the integration of the automotive design process, as previously mentioned including the participation of suppliers at the design stage. While some of this is now happening, and there are signs of more joint participation in the future, the Society believes that there is much left to be done in integrating seamlessly teams in the work place. There is still a culture of demarcation between blue collar and while collar workers and further more division of effort into design and production engineering. It is our belief that best outcomes are achieved when all of these barriers are broken down and people can be flexibly moved to facilitate each stage of the process according their skill, knowledge and experience. It is for that reason that the Society over a decade ago created its various technician grades of membership in order to accommodate the cooperation between design and service aspects of the automotive industry. As a recent initiative to encourage harmonious participation between those with tertiary engineering qualifications and those with certificates to advanced diplomas from TAFE the Society has encouraged the participation of joint University-TAFE teams in its Formula SAE competition.

A Major Contribution from SAE – Formula SAE

This competition in itself is an initiative to raise the skill and experience of graduates on entering the automotive industry through a major problem based learning experience, in the building of an open wheel racing car for competition with student teams from around the world. Specifically the benefits of our formula SAE program are:

- Enhancing employment prospects
- Preparing students for the work force
- Contributing to the development of engineers – "better trained" – "hands-on" engineers
- Professional development in
    - Team building
    - Meeting deadlines
    - Project management
    - Networking
    - General and Financial management
    - Sponsorship and communication skills
    - Customer relations
    - To be competitive

More about the concept is presented in Appendix 1

This competition was brought to Australia in 1999 by the CEO Angela Krepcik and Professor Watson with the specific purpose of using the automotive industry's advanced engineering standing as a challenge for these young people. It is fair to say that this competition has received unanimous and extensive support from the automotive industry and university departments of relevant engineering. This can be judged by the fact that in the space of the 3 years in which the competition has existed, the number of entrants from Australia has tripled, now involving about 350 students. Furthermore, in the second competition in 2002 an Australian team (from the University of Woollongong) nearly toppled the pride of the United States entry from the Rochester Institute of Technology. This was Woollongong's first year in the competition.

Plainly if team building and harmony across the degree-trade training is to achieve its potential for the industry it also needs to be delivered holistically in the industry, beyond good practice in production. If the Inquiry supports such concepts related to work place practices and integration to encourage best concurrent engineering practice, then it maybe that some mechanism to test this should be a requirement for companies seeking support through the ACIS scheme.

Lack of Government Supported Infrastructure for the Automotive Industry

In many countries with a major automotive presence, there is direct support to the industry through the creation of research infrastructure to support the motor industry. For example in the United Kingdom MIRA, in Japan JARI and in Germany there are several research institutes linked to universities which receive significant funding for their automotive R&D. The Government seems to have been particularly wary of creating such research facilities, including test tracks, wind tunnels and advanced emissions testing facilities that might be used at some subsidized cost by the industry in Australia and its suppliers. This Society has received in the past several propositions for such facilities, particularly for example for facilities to allow the testing of anti-lock brakes on a wide range of surfaces when these braking systems were in their formative days. Whilst today most OEM's have some variable surface test facilities, these are certainly not world leading. Further, the globalization of the motor industry does allow opportunities for access to specialized test facilities overseas, thus the evaluation of real needs for joint hardware facilities is very difficult to ascertain. In a time when the industry is moving significantly towards simulation before production it seems that government could support simulation research and development activity. Activity that embodies a significant amount of simulation engineering that ranges from the study of the severity of brain injury through to advanced emission control strategies and occupant thermal and noise and vibration comfort.

Further, the Society supports concepts that integrate R&D activity across the OEM-producer boundaries, and indeed the collective participation of the OEMs in features of R&D that have relatively little commercial competition, but require significant investments in the design developments and testing processes. Examples of such activity in the US might be the PNGV (partnership for the new generation vehicle) program. In contrast, examples in Australia, such as support for the aXcess cars, has been minimal in comparison, though the benefits in raising the level of technology and recognition of that technology overseas has been very significant with benefits in export earnings estimated to exceed a billion dollars. Even if this reported benefit is optimistic, it seems that government support for industry with direction can break down work place and process barriers we believe is essential to maintain the growth of our automotive exports. This is essential if Australia is to stand any chance of achieving production volumes that ensure the continuation of a viable industry.

SAE-A View on Tariff Targets and Related Options

In conclusion, the question of support should be recognised as not related to just the Australian Automotive Industry. It extends well beyond this industry and should be seen as an investment in the overall Australian Manufacturing Industry, as well as supporting a range of other industries which receive benefits from the existence of a technologically up to date and locally capable

automotive engineering and manufacturing base.
This includes the Tertiary Education institutions; the servicing side of the automotive and related industries; the employment opportunities for technological graduates which could not be otherwise absorbed . Without the size and demands of the automotive industry, many other aspects of Australian Manufacturing and technology would not be sustained and must also disappear. We would lose our present image in the Asia Pacific area , along with significant income as we would no longer be the destination for tens of thousands of fee paying technology aligned students from our region. This much broader understanding of what Assistance to the Automotive Industry really covers is critical to supporting realistic final recommendations.

SAE-As view is:

- No commitment should be made to further lowering of the Tariff below 10% until other nations with whom we trade or compete show similar levels of commitment to the reduction of tariffs and/or removal of various non tariff barriers (at National and lower levels of government, and also including union/worker protection agreements). Their willingness to do this remains highly questionable. If everything is even close to equal, most Governments and Companies will generally act to preferentially protect their home base citizens and local employees

- The assistance provided by Tariffs and the ACIS scheme are complementary but probably different in the areas they address and should not be seen as interchangeable or alternatives. The Tariff probably provides greater support to the OEMs than the Suppliers whereas the ACIS scheme is probably of more critical benefit to the Suppliers in terms of justifying critical mass of technological capability and development.

- From the foregoing, the logical approach to the Options for the movement in Tariffs and allocation of ACIS funds would be to adopt the Third Option in each case.
  SAE-A is persuaded that industry has managed progressive reductions of around 3.8% per annum in recent years in the productivity needed to achieve the historical 2.5% reduction in tariff. The effects and down sides of the first one-off 5% step reduction in 2005 are not known. Introducing another 5% reduction without knowing the effects of the first is unwise.
  Further, this is consistent with recognising that until other nations become more open, the Tariff should remain at 10% - a tentative future reduction of just 1% a year after 2010 is much easier to adjust back to reality than a preconceived step movement in 2010 or having prematurely adjusted it form 2005 onwards.
- Likewise, recognising that future tariff reductions may be a longer time phased operation, allocating the balance of ACIS funds equally between 2005-10 and 2010-15 provides maximum flexibility and enables a longer support period at significant levels.
- From the point above made on Tariffs vis a vis ACIS, consideration should be given to reallocating the application of ACIS funds to give a greater share to the Supplier Industry. Perhaps a 50/50 balance would be more equitable.

Other Considerations

Australia is a unique automotive operating environment with differing types of laws and rates of traffic accidents and deaths/injuries. As our export markets grow delivery into markets with

differing standards for emissions, safety and son is required. In order to optimise systems delivery trained and experienced engineering personnel covering a range of functions and working locations are needed. Much better national solutions will be achieved where we have a strong and well educated local industry supporting the academic and research infrastructure, to work upon the ongoing solutions, which will continuously need to be developed if we are to progressively move to higher and higher levels of operating and safety performance. SAE-A believes that it and the Commision have opportunities to support this delivery.

Appendix 1.

The Concept of Formula SAE-A

The Formula SAE competition (started in the USA) is for SAE student members to conceive, design, fabricate, and compete with small formula-style racing cars. The restrictions on the car frame and engine are limited so that the knowledge, creativity, and imagination of the student are challenged. The cars are built with a team effort over a period of about one year and are taken to a host institution (Ford, Toyota, Holden, and Mitsubishi) for judging and comparison with other competitors. The end result is a great experience for young engineers in a meaningful engineering project as well as the opportunity of working in a dedicated team effort.

For the purpose of this competition, the students are to assume that a manufacturing firm has engaged them to produce a prototype car for evaluation as a production team. The intended sales market is the nonprofessional club competition racer. Therefore, the car must have very high performance in terms of its acceleration, braking, and handling qualities. The car must be low in cost, easy to maintain, and reliable. In addition, the car's marketability is enhanced by other factors such as aesthetics, comfort and use of common parts. The manufacturing firm is planning to produce 1000 cars per year at a cost below A$50,000. The challenge to the design team is to design and fabricate a prototype car that best meets these goals and intents. Each design will be compared and judged with other competing designs to determine the best overall car.

The cars are judged in three different categories: static inspection and engineering design, functional performance trials and durability/endurance. These events are scored to determine how well the car performs. In each event, the manufacturing firm has specified minimum acceptable performance levels that are reflected in the scoring equations. The following points are possible:

75	Presentation
150	Engineering Design
100	Cost Analysis
75	Acceleration
50	Skid-Pad Event
150	Autocross Event
50	Fuel Economy Event
350	Endurance Track Event
1,000	Total Points