VOLUNTEER

OFFICIAL JOURNAL FOR THE COUNTRY FIRE SERVICES SOUTH AUSTRALIA

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Competition News

Rescue Course Launched

Fire Fighting Foam — application

VOLUNTEER

From the Director

Mr. A. D. MACARTHUR
Director, S.A. Country Fire Services.
Chairman, S.A. Country Fire Services Board.
Chairman, S.A. Bushfire Prevention Council.

It is pleasing to write this Editorial and relect on the C.F.S. after three years involvement as Chairman of the Country Fire Services Board and Director C.F.S.. The organisation can now look behind it and recognise positive progress in the many issues which in 1985 seemed almost insurmountable. That progress has been achieved at all levels in our service by a positive and hard working approach to the problems that confronted us. With a continuation of that approach we will go from strength to strength.

One factor which will undoubtedly have the greatest impact on the service in the future is the strong united ground swell developing within the C.F.S. Volunteers. For far too long Volunteers have been spoken for by other organisations and at long last they are emerging in every region, united as one voice as Regional Volunteer Associations to support the State body.

Region 1, under the strong leadership of Noarlunga Group Captain Ron Bowden and Secretary John Forster is progressing steadily and is in a position now to have strong influence on the State Association. Likewise a 200 strong meeting at Gawler recently elected a 'Steering Committee' to form a Region 2 Association to be affiliated with the State body. Similarly I believe Region 5 has proposals to be implemented in the next month or so. Therefore, after many editorials calling for Volunteer unity over many months, at long last the service is responding.

Readers will recall that in 1985 the Board established Volunteer based committees to assist with the development of C.F.S.. These committees, each comprising at least 4 Volunteer members with a Staff executive officer, have been given the opportuniy to assist the C.F.S. Board in development of policies; the design and requirements for equipment, Training needs, Communications needs etc. Additional committees may be formed as specific needs are identified.

Through these committees, the Volunteers pass their experience and expertise to the Board on a wide range of topics. To those of you who have progressive ideas on "Volunteerism" and the needs of a Volunteer service I am sure your views would be welcomed by any of the committee members or by the Volunteer representative of the C.F.S. Board, Mr Peter Mew. In fact all members of the C.F.S. Board welcome the opportunity to discuss C.F.S. policies and direction with Volunteer personnel. For those of you who attend the Regional Competitions, which commence again shortly, they are an ideal forum to exchange views and an increased attendance this year would be welcome.

The Board's priorities towards training is the other big plus which is enormously successful. Again, a huge work load, a good deal of it behind the scenes, is carried by R/Os Richard Hutchins, Mike Gordon and David Batten. These officers, on whom the responsibility for organisation and coordination of training falls, the Board and myself are very grateful for your untiring commitment. I am pleased the recognition by Volunteers of the value of training is also apparent.

To those who have been unable to get to training schools or those that have to go on a waiting list for "specialist" courses, please keep trying — it is only by skills development that the service of the future can meet community expectations.

In summary, a very exciting time for C.F.S..

A.D. MACARTHUR
Director, S.A. Country Fire Services
June 1988

Lucky Win helps Clinton C.F.S. get New Phone Alarm System

Fire fighting facilities on northern Yorke Peninsula will be updated and made more efficient, thanks to NZI Insurance.

The Clinton Country Fire Service brigade was presented with a cheque for $500 on Wednesday, 20 April, 1988 as part of the 1988 Rural Fire Safety Awards, sponsored by the company.

The money will go towards improving the district's fire fighting efficiency, Clinton brigade captain, Mr. Allan "Snow" Crowell, said.

"We have for quite some time been looking at ways of improving communications with volunteers in the event of fire," he said.

"The money will enable us to upgrade our call-out communications system which will allow us to contact members more quickly and to get to fires sooner."

As well as on-farm judging, the competition included a lucky draw prize which was open to all SA entrants and comprised $500 each for the winner and his local C.F.S. brigade.

The Statewide draw was won by Mr. Peter Birkin who crops barley and wheat and runs 350 sheep on his 320 ha property at Clinton.

He plans to use his winnings to buy a new pump for his on-farm fire fighting unit.

Presenting the cheques at Kadina on Wednesday, SA country branch manager for NZI Insurance, Mr. John Skidmore, said his company, through the annual awards, was proud to be helping improve fire safety consciousness in SA.

"We are pleased to see that the Clinton brigade has a project in hand where the money will make an immediate worthwhile contribution to the local community," he said.

The aim of the annual awards is to encourage higher fire prevention standards in rural areas.

Pictured above: John Skidmore (right) presents the winning cheques for $500 each to Allan "Snow" Crowell (centre), Clinton C.F.S. brigade captain, and Clinton farmer Peter Birkin.

From the Board

MAY & JUNE 1988 BOARD MEETINGS

Meeting with Minister

The C.F.S. Board has arranged a meeting with the Minister of Emergency Services on 21 June 1988 to discuss a number of issues. Major items on the agenda will be amendments to the Country Fires Act, Funding, and the rationalisation of C.F.S. and MFS services and boundaries.

C.F.S. Rank Markings

The Board has approved the recommendation from the Uniform Sub-Committee for standard fire service rank markings. The Board also agreed to provide the new rank markings at no cost to the Volunteers. Planning has commenced to implement the changes and details will be provided as soon as plans have been finalised. The New Standard Fire Service rank markings will be published in the next issue of the Volunteer.

Country Board Meetings

Two Board meetings will be held in country areas this year at Waikerie on Monday, 1 August and at Streaky Bay on Monday, 15 August 1988. The meetings will provide an opportunity for the Board to meet with the volunteers and also will coincide with Board Members' attendance at competitions.

South East Fire Fighting Association

Members of the Board have accepted an invitation to attend a meeting of the Region 5 Brigade delegates on 22 June 1988 at the Chardonay Lodge, Coonawarra.

Standards of Fire Cover

A draft revised Standards of Fire Cover report has been reviewed by the Board and will be further considered at the next Board meeting. This document will form the basis for developing Board policy over a wide range of C.F.S. activities and it is planned to produce a public document on finalisation.

Fire Stations

The Board has approved recommendations from the Vehicle and Equipment Sub- Committee for minimum standards for one and two bay fire station design and siting.

Fire Appliances

Tenders have been received for the supply of approximately 60 × 2,000 litre and 30 × 3,000 litre appliances and are now being evaluated for letting in the near future.

Identification of C.F.S. Appliances

The Board has approved recommendations for Standard C.F.S. colours and identification of appliances. These standards will be published in the next edition of the Volunteer.

Registration of Brigades and Group Committees

The following has been approved:

New C.F.S. Brigade
— Region 2 Communications unit.

New C.F.S. Group Committee
— Pinaroo District
— Bute and District

De-registration of C.F.S. Brigade
— Northfield

Stowage Kits for New Appliances

The Board has approved the recommendation from the Vehicle and Equipment Sub-Committee that all future appliances be fully stowed to Brigade minimum requirements prior to appliances being delivered.

Volunteer Fire Brigades Association

The Board resolved to strengthen its support for the VFBA by recognising all new volunteer Regional associations, as an integral part of the State body.

NEW PLANNING LEGISLATION

Interim authorisation was granted to the Mt. Lofty Ranges Bushfire Prone Area Supplimentary Development Plan on 28 April 1988. This legislation is complimentary to the Building Standards discussed in the October 1987 issue of the Volunteer (page 15).

SDP Objectives

The objectives of the Supplimentary Development Plan (SDP) are twofold:

(1) protection of life and property from the effects of bushfires
(2) to direct development away from sites and areas with an unacceptably high level of bushfire hazard.

Consultation

To achieve these objectives a consultation process between C.F.S., Government and Local Government planning authorities has been established. It is the intention of the SDP that consultation will be compulsory in areas of very high bushfire hazard. During the period of interim authorization consultation is not compulsory but has been recommended by the Minister for Environment and Planning.

Issues

The consultation process requires C.F.S. to comment considering the following issues:

Issues cont.

Land Division:

- size proportion and layout of allotments
- bushfire hazard
- access

Building for residential or tourist use:

- bushfire hazard
- access
- siting
- water supply
- vegetation management

C.F.S. recommendations will be forwarded to the relevant planning authority to be considered during the planning consent process.

BUREAU TO WARN OF FIRE DANGERS

In January 1988 the Bureau of Meteorology introduced an additional mechanism to advise the S.A. public of fire danger during summer.

The Director of the Bureau of Meteorology Mr. Graham Furler said that the Bureau had a responsibility to issue fire weather warnings when conditions arose to indicate the potential for serious fires.

Total fire bans are cleared by the Country Fire Services at 6 p.m. for the following 24 hour period from midnight to midnight.

However, Mr. Furler said: "Occasionally weather conditions arise which are not foreseen on the previous day.

"Fire weather warnings will then be issued by the Bureau to advise the public of the fire potential in specified districts in the State."

These fire weather warnings are complementary to the total fire ban system.

They intended to indicate that the day was now forecast to be one in which the public should be extremely careful and adhere to the laws for using fire during the fire danger season.

Mr. Furler said that the fire weather warning was a service to the public in the same way as warnings were issued for frost, wind or road weather alerts.

The C.F.S. and the Bureau of Meteorology will continue to liaise closely to ensure that the public of S.A. has the best possible fire danger warning system.

AERIAL SUPPORT

by C.F.S. H.Q. Communications Centre Operator Neil Ellis

Aerial support to fire fighters on the fire ground is provided in the form of direct suppression by the laying of fire retardant from fixed wing aircraft and the use of helicopters as an aerial platform for fire surveillance.

Crew

When despatched to a fire scene the helicopter is crewed by an experienced air observer leader from C.F.S. Headquarters, or National Parks and Wildlife Services. The observers, apart from being experienced in helicopter operations are also experienced fire fighters.

A specialist group of air observers are qualified in winching operations and can be utilized for the placement of crews into inaccessible areas for control or mop-up operations. As the operators are fully trained the aircraft may also be used to rescue injured persons from the fireground.

Training involved

Training for the operators is carried out monthly in different areas so that experience is gained in varying types of topography. The training is conducted under guidelines laid down by the Steering Committee of the State Rescue Helicopter and under the supervision of a police S.T.A.R. Force Instructor. In addition training with the "Bambi" bucket is also undertaken.

Bambi

Whilst the "Bambi" bucket is of limited value in fire fighting it can be quite useful in mopping up situations. The bucket has an operating capacity of approx. 360 Lt (80 Galls.) under ideal conditions. Whenever Rescue I is "Called Out" to an incident away from the Adelaide Hills area, the "Bambi" bucket is taken along.

Aerial platform

The main role of the helicopter at a fire scene is to provide an aerial platform for the gathering of information in relation to direction of travel — rate of spread, and area of fire. Wherever possible the Officer in Charge of the fires suppression will be taken on board so that he can have an overall picture of the fire and make the necessary command decisions. The air observer will accurately map the perimeter of the fire and continually update the map for the use of the fire commander and C.F.S. H.Q.

COMPETITION NEWS

Are you Eligible?

With the first of the C.F.S. Regional Fire Fighting Drill Competitions due to start in mid July 1988, competing brigades are reminded that winners and runners-up of all regional events automatically become eligible to compete at the C.F.S. State Championships.

Accordingly, following your regional competitions, please inform your local Regional Officer if your team is unable to attend the State Finals to compete and represent your Region.

1988 Programme

Regions 1, 2 & 3 at Mt. Barker, 17 July.
Regions 5, 7 & 8 at Waikerie, 31 July.
Regions 4 & 6 at Streaky Bay, 14 August.
STATE CHAMPIONSHIP FINALS at Tilley Recreation Park, Yatala Vale, 28 August. (Host Brigade - Tea Tree Gully C.F.S.).

Nominations

For brigade teams or individual members who wish to compete or are considering enrolling in Regional events — "Nomination Forms" can be obtained from your local C.F.S. Regional Office.

In some Regions at the discretion of the organising committee nominations may be required prior to the day of the competitions. Otherwise crew members must nominate at the control vehicle, prior to the commencement of the competitions.

Trophy Prizes

Teams and individual winners and runners up of Regional and Visitors' drill events for their achievements are awarded individual trophies and memorial certificates printed on quality parchment stock.

Pennants for each drill event are also presented to the winning brigade.

State Championship winners and runners-up receive personalised trophies and parchment certificates and each winning brigade receives a felt pennant.

Adelaide Trophy Centre located at Goodwood and Christies Beach (phone (08) 271 8430) have been awarded the contract to supply trophies for the 1988 Regional Fire Fighting Drill Competitions.

Senior Dry Hose Drill

The C.F.S. Board's competition sub-committee will award as from this year, individual trophies for winners and runners-up of the Senior Dry Hose Drill State Championship event.

A special pennant will also be presented to the winning team.

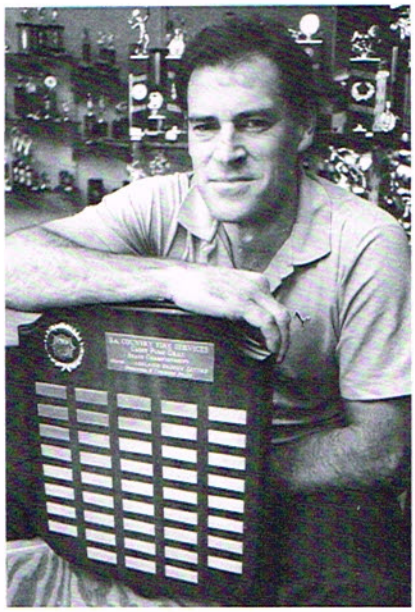
New Cadet Event

The new "Cadet Pump Drill" is expected to be strongly contested for the first time this year. (Refer article "New Cadet Drill for 1988", Volunteer Volume 39, page 4.)

C.F.S. cadets now have three drill events to enter this season. The other drills being: The Cadet Dry Hose Drill and The Cadet Hose Reel Drill.

New Cadet Event cont....

Adelaide Trophy Centre General Manager Mr. John Rutherford has generously donated nine (9) perpetual trophies for the *new* Cadet Pump Drill event (Regional & State).



Pictured above Mr. Rutherford displays one of the new perpetual Shields Cadets will be vying for, at the 1988 Regional Fire Fighting Drill Competitions, along with individual trophies awarded to team members.

From the V.F.B.A.

South Australian Volunteer Fire Brigades Association

Region Two Volunteers Show Strength

The meeting of over 200 C.F.S. members at Gawler on the 11th May 1988 showed their resolve to speak as a united voice by unanimously voting in favour of a motion to form a Regional Volunteer Fire Brigades Association.

A steering committee was formed to draft a constitution and to report back to a general meeting of volunteers. (Refer article "Volunteer fire fighters seek unity".)

Region One Volunteers take action on vital issues

A recent general meeting of the Mount Lofty Ranges Region One Volunteer Fire Brigades Association reviewed some of the major challenges facing the C.F.S. and resolved to take action by advising the Minister of Emergency Services by deputation and written submission that he take action to:

- halt M.F.S. expansion into C.F.S. areas, in particular the projected programme by M.F.S. to expel C.F.S. Brigades without consultation.
- encourage a better working relationship between M.F.S. and C.F.S. personnel.
- immediately introduce the long-awaited amendments to the Country Fires Act.
- provide a better Statewide funding system.
- have the policies of the C.F.S. Board used as the basis for the provision of fire suppression resources throughout the entire State.

The V.F.B.A. has also written to the Minister, with copies to every State M.P., urging him to ensure that there is no further delay in instituting the new funding system.

V.F.B.A. to be solely representative of Volunteers?

Notice has been given that at the Association's A.G.M. in August, a motion will be put which will have the effect of making all delegates to meetings representative of Regional Volunteer Fire Brigades Associations. As has been stated previously in the V.F.B.A. section of the "Volunteer", the C.F.S. members must be able to speak with a united voice and that voice must be one of authority, the authority of the majority of C.F.S. volunteers throughout the State. Region One has formed and Two is in the stage of forming a V.F.B.A. which means that over half the active members in the State are having a voice. It is to be hoped that all Regions and the area outside regional boundaries will be able to form their own Volunteer Fire Brigades Associations. The present Fire Fighting Associations with their membership drawn from volunteers, Board appointees, Local Government and State Government Agencies cannot be seen to be representing the volunteers.

Policy Development

The V.F.B.A. Executive is now preparing a number of policy statements so that its representatives on committees and the volunteers' member(s) on the C.F.S. Board have some guidance when they are faced with contributing to decisions which affect volunteers.

Policies are currently being developed on the following

— M.F.S.
— Volunteer Compensation
— Consultation with senior C.F.S. staff

Policy Development cont....

— Planning the future of C.F.S.
— Training
— Appliances

Once adopted by a General Meeting, these policies will be published in the "Volunteer".

Consult with Councillors

While the M.F.S. has the right to expand its boundaries C.F.S. Brigades who feel under threat should consider asking their local councillors to make sure that the Council considers the matter objectively and then makes its views known to MFS and C.F.S.

After all, Councils should act as advocates for the ratepayers.

Questions asked by Councils of both MFS and CFS should include:

- response time
- available equipment
- manpower and equipment backup
- ability to combat all emergencies in the particular area
- cost

If, after consideration of all the facts Council can justify the disbanding of an efficient volunteer brigade then that is what must happen for the benefit of the community.

JOHN FORSTER
Hon. Secretary

Volunteer Firefighters Seek Unity

A meeting of over 200 C.F.S. members at Gawler on 11 May 1988 voted unanimously to form a Regional Volunteer Fire Brigades Association for Region Two.

With a view to developing a "united voice" through one strong Regional Association C.F.S. Volunteer Fire Fighters from Gumeracha to Robertstown in the Lower North and Eudunda attended the meeting at the Gawler Raceway.

The meeting chaired by Mr. Brian Wilson of Two Wells discussed many issues including funding, fire appliance design, future rationalisation of brigades, relations with Metropolitan Fire Service and the need for a strong and united Volunteer association throughout the State.

Mr. Wilson, Vice-President of the S.A. Volunteer Fire Brigade Association and Group Captain of Mallala C.F.S. Group said, "C.F.S. Volunteers need to become united on a statewide basis and the way to accomplish this is through Regional Associations of the same composition."

Spirited discussion took place with a panel comprising of the C.F.S. Director Don Macarthur, C.F.S. Volunteer Board member Peter Mew, President of the S.A.V.F.B.A. Peter Swann and Officer in Charge of C.F.S. Region Two Peter Ferris.

Statements made by the panel supported the concept of a single volunteer association in Region Two instead of the existing Fire Fighting Associations, made up of representatives from the Volunteers, Local Government, National Parks & Wildlife Service and Woods & Forests.

The meeting culminated in a unanimous vote in favour of a motion to form a Region Two Volunteer Fire Brigades Association and the following Volunteers were elected as a steering committee:

Jim Sandford, Tea Tree Gully; Peter Watson, One Tree Hill; Ross Schlein, Gumeracha; Brian Wilson, Two Wells; John Angas, Angaston; Ron Pullen, Salisbury and Tony Wege, Nuriootpa.

OBITUARY

JEAN BEATRICE SHIPPARD COWELL C.F.S.

The members of the Cowell Country Fire Service Brigade, Ladies Auxiliary, and Franklin Harbour Fire Fighting Associations pay tribute to the memory of Jean Beatrice Shippard of the Cowell C.F.S.

Jean joined the brigade in 1976 and during her 12 years' service proved to be an extremely valuable asset to the community and brigade and a good friend.

Jean formed the brigade's Ladies Auxiliary and was strongly instrumental in holding many successful fund raising projects.

As an active member of the local Red Cross, Jean received numerous awards for service.

The C.F.S. expresses its sincere condolences with the passing of their friend Jean Shippard.

REGIONAL NEWS

Region 1

Safe Season

With the 1987-1988 fire danger season behind us, I believe we can reflect on how fortunate we have been in Region One. Our "major fire" input was limited to the supply of task forces to assist in other regions — our thanks to those Group Captains who so willingly made units from their groups available, and of course to the crews who so ably manned those units.

Visitor

Region One hosted D/O Len Caple from the Western Australian Fire Brigades Board for the week 21st-25th March. Len's week was a rather hectic one, spending time with Mr. Geoff Knight (Group Captain Stirling) and Mr. Ray Collins (Group Captain Mitcham Hills) discussing urban/rural interface of fire services along with a visit to Region Two (an inspection of the then recent Kersbrook fire scenes) and managing to attend the Region One National Medal presentation mid week. Len enjoyed his stay, and the Region One staff learnt a lot from entertaining this experienced officer from the west.

National Medal Presentations — 1365 years' service

Forty-nine National Medals were presented by the C.F.S. Director, Mr. Don Macarthur at a ceremony at the Aldgate Community Hall on the evening of 23rd March. The medals and clasps presented that night represented some 835 years of voluntary service. The recipients were joined by one hundred and fifty family and friends, and all present enjoyed a beautiful supper supplied by the Stirling Group Ladies Auxiliary. On Friday 6th May a further sixteen medals were presented to members of Summertown C.F.S. at a special anniversary dinner held at the Eagle on the Hill Motel. This brought the total years of service represented by National medals and clasps to 1365 years.

Training

The training year is well underway with three CABA schools, Instructors Workshop and a Level 3 course already completed. We look forward to seeing those of you who have nominated for the remaining schools.

A/O.I.C. — R.O. Chris Martin
Assist — R.O. Noel Finlayson

Region 3

Training

Level 1 training within the Region has been completed for 1988 with 3 courses successfully conducted on Yorke Peninsula and Kangaroo Island.

Level 2 courses are still to be held in both areas followed by a Level 3 at Brookway Park in August. All eligible brigades will be notified with sufficient time to submit nominations.

Commissioning

C.F.S. Personnel from Minlaton, Brentwood, Curramulka, Pt. Vincent and Yorketown attended the commissioning of the Minlaton C.F.S. new Type 4 appliance on Sunday, April 10.

Following the ceremony, Brentwood and Pt. Vincent C.F.S. members demonstrated skills with a simulated Vehicle Accident Rescue exercise and rescue from a smoke filled building using Compressed Air Breathing Apparatus.

National Medals

On Saturday, May 14, National Medals were presented to the following Yorketown personnel:

IAN QUENTIN HAYWOOD
Group Captain

LESLEY KEITH BUTLER
former Group Captain

Les Butler, who now resides in Mount Gambier, was unable to attend but his medal was ably and proudly accepted by son Greg, a Lieutenant with the Yorketown C.F.S. brigade.

Congratulations to Ian and Les on well deserved awards in recognition of their dedication to the C.F.S. and the community.

Explosives

On Friday, May 13 the M.V. Hornestrand docked at Pt. Giles, some 8 kilometres north of Edithburgh. The ship, flying the Danish flag, was inbound from the port of Bilboa in Spain with 474 tonnes of explosives consigned to E.R.T. Explosives, of Gladstone, in the state's Mid North.

The unloading and transportation of the shipment necessitated strict observation of certain procedures and safety regulations.

Although a number of other Ports are considerably closer to Gladstone, Port Giles was selected due to its remoteness, with only one farmhouse being within a 2 kilometre radius of the complex.

A number of specially designed and equipped trucks, licensed to carry explosives were used to transport the consignment to Gladstone and all C.F.S. brigades along the designated route were advised.

As this was the first time an operation of this nature had occurred in South Australia various organisations were consulted in order to formulate plans and to establish procedures. These organisations included the Department of Marine and Harbours, Commonwealth Department of Transport, Department of Labour — Dangerous Goods Branch, Country Fire Services and State Emergency Services.

Region 3

It is anticipated that 2 or 3 shipments per year will be made importing both explosives and raw materials. Future plans are to manufacture explosives at Gladstone with the view to exporting the finished product.

C.A.B.A.

Exercises were conducted recently at Ardrossan and Yorketown using the C.A.B.A. Mobile Training Unit. Both nights were well attended. A number of B.A. operators took advantage of the opportunity to refresh skills.

O.I.C. — R.O. Winston H. Bryant

Region 5

Accident Rescue

An Adelaide truck driver is lucky to be alive after his semitrailer smashed into a service station on Penola's main street, demolishing the building and crushing the prime mover cab.

The truck cab had flipped upside down and a local crane was used to lever the cab to give rescue workers access to the injured man. Air bags were provided by Naracoorte C.F.S. to stabilise the truck while the rescue took place.

Rescue workers took two hours to cut the driver free.

The truck's fuel tank ruptured, spilling diesel and Penola C.F.S. Volunteers worked quickly to cover the area with foam, preventing any danger of the diesel ignighting. Brigades also kept a close watch on the service station's underground reservoir opened when the petrol bowsers were ripped out during the accident.

ETSA disconnected power to the building during the rescue. Clean up operations were completed within 3½ hours of accident. Damage to the building, semitrailer and its load was estimated at $200,000.

Extracts courtesy Border Watch, Mount Gambier

Mill Blaze

Fire destroyed the number one mill at Cellulose Australia Limited near Millicent on Friday, 22 April 1988. Damage is estimated at $4 million.

Nineteen fire units and four tankers battled the blaze for more than three hours as the flames threatened a nearby chemical storage area and other mill sections.

C.F.S. units were called from all groups in Millicent, Beachport, Moorak, Woods & Forests Dept. 2, and Mt. Gambier M.F.S., as well as tankers. Earth moving equipment (including a front end loader and back hoe, excavator and bulldozers) were also used.

The fire is believed to have started in the main storage area which contained 1500 tonnes of tissue paper, stored in bundles, some weighing up to one tonne each. It took a fierce hold of the unoccupied building, destroying it along with the board making machine shed and engineering machine shop.

Continued page 7

Region 5

Mill Blaze cont....

Nangwarry C.F.S. patrolled surrounding paddocks to prevent flying debris and ash from igni ting grass. Spot fires were reported but were kept under control.

Millicent S.E.S. patrolled Princes Highway while police prevented the public from gaining access to dangerous areas. About 150 fire fighters and emergency personnel attended.

Use had been made of protective clothing and only one minor casualty apart from smoke inhalation was reported — a nail in the foot of a Glencoe C.F.S. member.

A sprinkler system was installed over the area and the mopping up was handed back to Cellulose by lunch time Sunday.

Extracts courtesy the Border Watch & South-Eastern Times

Region 6

Training

Over the last 2 months training has got into full swing with district Level One courses being run by brigades. A number of fire fighters also attended local St. John's courses.

The Pantechnicon van was used during the month of April by all C.A.B.A. operators and fire fighters in training to become C.A.B.A. wearers. Next year we hope to have the Pantech in June to allow more time with each brigade.

Meetings

In May, R.O. M. Sherwell and myself attended a number of meetings in Region 6, to discuss the formation of Operational Groups to replace Associations. Meetings were well attended, and all questions answered.

Plan for 1988/89

With most areas receiving opening rains we will all have to start planning now for the 1988/89 Fire Season. Later in the year a number of fire tracks will be inspected with Local Government and National Parks personnel.

D.S.B.

Towards the end of October/early November a major exercise will be run for the five Dangerous Substances Brigades in Region 6. Activities will last one full day.

Competitions - Reminder

We must all remember the Region 6 C.F.S. Fire Fighting Drill Competitions will be held on 14 August, 1988 at Streaky Bay.

C.F.S. Brigades are asked to support competing teams.

All Brigades who compete in the region have been contacted by letter. Please notify Region 6 Headquarters on 82 4266 so that accommodation and meals can be arranged.

Let's make it a go ahead year again.

Region 6

Incident

On 22 May 1988, I attended an LPG Gas tanker rollover 20 km north of Whyalla. The tanker was fully loaded with 21 tonnes of LPG Gas. The tanker which skidded across on its side received only minor damage while the prime mover was flattened to dash height.

Stirling North C.F.S., Metropolitan Fire Service of Whyalla, Police, St. John and State Emergency Services with Stevenson Transport personnel were in attendance for approx. 12 hours. Brambles provided heavy crane equipment and Santos supplied gas detection equipment to make the scene safer to work in.

O.I.C. — R.O. Kevin May
R.O. Paul W. Barnard

Plastic Containers — Warning

Wudinna Emergency Services were recently called to a vehicle rollover on Highway One, 13 km west of Wudinna. The driver received minor cuts and was transported by St. John to the Wudinna Hospital.

The early model Valiant Station Wagon was found to be leaking fuel from a spare tank in the boot. The spillage was cleaned up and fire fighters stood at the ready as the vehicle was righted.

The vehicle also carried some 84 plastic containers (64 × 2 litres and 20 × 4 litre).

Upon closer inspection all containers were found to contain petrol.

Spokesperson for Wudinna C.F.S., Robert Young said, "We were sitting on a time bomb and didn't even know it. None of us were aware of the situation until the lid was removed from one of the containers. This must be a warning to all of us to expect anything anytime. All we needed was a spark and we would have lost eight people including myself," said Mr. Young.

OPERATION FIRESAFE

Region 6

Wudinna C.F.S.

by Captain Paul Hutt

The fire fighting capabilities of the Le Hunte area was enhanced with the introduction of a new GT175 Type 4 Hino for Wudinna C.F.S., which replaces a 1981, 610A International Acco.

The Hino is fitted out to handle Dangerous Substance Spillages, Vehicle Accidents, House, Stubble Grass and Bushfires.

The brigade's social fund financed two monitor points and Second Hand Rose donated a C.A.B.A. control board.

Twelve brigade members did a refresher course in Search and Rescue and C.A.B.A. operation during the recent visit by the Pantech van.

Repairs have been made and the compressor returned to Wudinna.

A mock Hazchem incident involving Wudinna C.F.S., St. John and S.E.S. enabled all organisations to gain a greater appreciation of each others capabilities.

Wudinna hosted a meeting of representatives of brigades from the Kimba and Le Hunte area to hear R.O. Kevin May and Murray Sherwell explain the operations group system.

Region 7

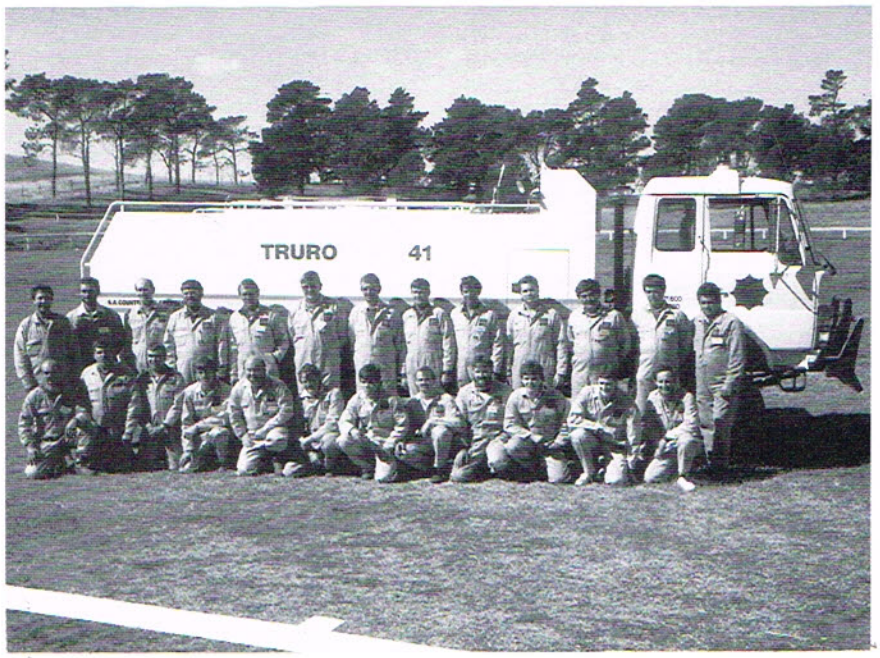
Level One Course

The week-end of 16 and 17 April, 1988 was a busy one for Truro C.F.S. members. R.O. Andy Lawson ably assisted by local C.F.S. volunteer instructors Colin and Peter Bergermister, Norm Coutts, Terry Durrack and Geoff Sinclair (Waikerie C.F.S.) successfully put 22 volunteer fire fighters through a Level 1 course. Younger members learnt new material while senior members re-inforced knowledge gained over many years.

Continued page 8

Region 7

New Appliance



On completion of the Level 1 course, at a well attended gathering C.F.S. Executive Officer Mr. Alan Ferris commissioned Truro's new type 4 appliance. Handing over the keys to brigade captain Tom Palmer, Mr. Ferris said "the community of Truro has a C.F.S. Brigade and appliance of which it should be very proud".

Service Certificates

Following the commissioning Mr. Ferris presented "special" Life Membership Certificates to seven men who were early founders of the local Truro brigade, and 20 and 10 year certificates to eleven brigade members. The stars and Life Membership represents over 345 years' service to the C.F.S., a very valuable contribution to the protection of life and property.

The following members received Service Awards:

Life Membership Plaque for 35 years' service.

Norm Miller	Scobie Ruediger
Max Jaeger	Bill Bode
John Scott	Cliff Klemm

Life Membership for 35 years' service

Lionel Linke

20 year Service Stars

Ken Steinert	Graham Palmer
James Miller	

10 year Service Stars

Robert Page	Dudley Dittrich
John Anderson	Geoff Crook
Robert Sherwood	Andrew Sherwood
Bill Loffler	Neil Loffler

Congratulations to the above members and all members of Truro C.F.S., for a very successful week-end and we hope the support and training will continue in Truro.

C.F.S. Regional Competitions

The Regions 5, 7 and 8 Regional Competitions will be proudly hosted by Waikerie C.F.S. on Sunday, the 31st of July, 1988. The opening parade commences at 11.00 a.m. at the Waikerie Oval. All visitors are welcome for a most enjoyable day.

Accommodation in Waikerie is limited, so please contact Brian Jenke on (085) 413 925 A.H. for accommodation details. If your Brigade wishes to compete please return your nomination form to:

P.O. Box 519,
MURRAY BRIDGE, S.A. 5253.

Forms are available by ringing Murray Bridge Regional Office, (085) 326 777 B.H.

Training

The concept of Brigade level training has been very well accepted this season with Level One courses conducted at Truro, Waikerie, Barmera and further courses planned at Sedan and Paringa.

Officers' Course: Over the last week-end in April, 17 Officers from the Riverland attended an Officers' Course conducted at Brookway Park Fire Training College. This course is aimed at officers, concentrating on leadership and good management of a C.F.S. Brigade. The knowledge gained and ideas discussed we hope will greatly benefit the Riverland C.F.S. brigades. Much of the week-end's discussions centred around grouping of C.F.S. brigades, to encourage brigades to train and work together more efficiently. It is hoped that further courses such as this may be conducted in the Region next year.

Instructors' Courses: Members from Barmera and Waikerie C.F.S. attended a Breathing Apparatus Instructors' Course at Metropolitan Fire Service Headquarters over the week 24th to 29th of May, 1988. These two instructors will be an asset to the Riverland assisting at C.A.B.A. and C.A.B.A. Refresher courses. A Volunteer Instructors' course is planned in June to be conducted in Waikerie Fire Station. At this stage, Region 7 has only one instructor and with the increased training at Brigade level, more instructors are required.

Region 7

Swan Reach C.F.S.

On Sunday, 27th March, 1988 a VERY SUCCESSFUL Ski Championship was held at Swan Reach. Organised and run by Swan Reach C.F.S. the day known as the Swan Reach C.F.S. Ski Carnival entertained in excess of 350 people with 10 hi-powered boats competing. The day consisted of relay and drag races with 6 persons on each team for each boat. "Live Wire", a local Swan Reach boat, won the "A" Grade competition with "Foot Rot", an Adelaide boat taking out the "B" Grade. The Australian Central Credit Union Display Team entertained the crowd with trick ski-ing, ski jumps and first class ski-ing. At the competition of the day the crowd were treated to a grudge race between the two duty boats. Unofficially won by Captain Cummings a protest was placed resulting in a draw and sharing of the one dozen West End Prize.

The day was a huge success with in excess of $1,500 raised for Swan Reach C.F.S. — Congratulations — keep it up.

O.I.C. — R.O. Andy Lawson

Region 8

D.S.B. Training

Region Eight's two Dangerous Substance Brigades were subjected to individual exercises recently, without notice, to determine the retained skill levels in this discipline of the Service. Both Brigades are now more committed to the need for regular, on-going training in the setting up of decontamination zones and C.A.B.A. usage.

A shortfall in necessary equipment to undertake much of this work was also highlighted; an area about to be addressed as a priority.

Training Schools

Five Level One Training Schools have been conducted in the Region to date, catering for 116 volunteers in five districts, Peake, Pinnaroo, Meningie, Murray Bridge and Mannum. One Level Two has been run in Pinnaroo also, with others to follow shortly. A special mention must be made of the Regional Training Committee who are co-ordinating the volunteer instructors for the various areas undertaking the Training Schools.

New Fire Station

Coomandook C.F.S. have a Fire Station in the town in which the recently acquired Hino Type Four is to be garaged. Previous arrangements for housing of fire appliances, both current and past, was on private property belonging to Mr. Bill Ballard. Thanks for your assistance in years past, the Service is much indebted to your generosity Bill.

O.I.C. — R.O. Des Packer

Region 8 News continued page 16

C.F.S. LAUNCHES RESCUE COURSE

A far reaching education program in vehicle accident rescue for many of the State's C.F.S. volunteer firefighters has been announced by the Director of Country Fire Services, Mr Donald Macarthur.

The course will equip C.F.S. volunteers with accident rescue skills to ensure the co-ordinated approach to rescues throughout the State. It will be taught in Adelaide and by a mobile training wing in all C.F.S. Regions.

Commenting, Mr Macarthur said: "It is essential that all rescue resources available to South Australians are utilized and co-ordinated to the optimum.

"This is the only way we can provide an immediate and effective response rescue service during emergencies such as vehicle accidents, fire, or the escape of a dangerous substance.

"Sophisticated medical techniques and highly skilled hospital personnel are of little use if poorly trained and inadequately equipped rescuers complicate injuries at the scene of an accident.

"As a result, we have developed an intensive education course which ensures accident victims will get the most professional treatment possible."

The course — which is held over two days — details:

- the procedures involved in the rescue of casualties
- the assessment and care of casualties
- the safety precautions required in rescues
- the methods of extrication using sophisticated equipment
- the handling of debris and high voltage and live wires
- the co-ordination of the various emergency services — and the duties of each emergency service.
- the preservation and noting of evidence that may be required in a court of law.

Life — first priority

Mr Macarthur said: "The first priority is the preservation of life — and the course details the evaluation of an accident scene and casualties and initial stabilisation of patients.

"One of the main points our course emphasises is that the vehicle is removed from around the patient, not the patient from the vehicle.

"For example, we must develop a situation where the patient has no feeling of claustrophobia if we are to assist resuscitation, and this can often be achieved by the removal of vehicle front doors.

Feet trapped

"Statistics show that 97 per cent of casualties are trapped in the front seats of vehicles and many of those are trapped by their feet.

"The C.F.S. rescue teams will be trained to start at the feet and work up when establishing how patients are trapped — many are trapped by their shoes between the pedals."

Equipment evaluation

The C.F.S. Executive Officer Mr Alan Ferris praised the generosity, commitment and foresight of leading manufacturers and distributors of rescue equipment in Australia. Enerpac, Holmatro, Fag Lucas and Hurst have provided many thousands of dollars worth of equipment for training and evaluation.

He added: "Road accident rescues are among the most testing duties C.F.S. personnel can be called on to perform. They require the best equipment available for the task.

"Many of those accident rescues are carried out on busy highways — surrounded by high speed traffic, and our crews are often subjected to considerable danger.

"A high proportion of accident fatalities occur through lack of, or even poor, handling at the scene of an accident.

Combined Operation

"The C.F.S. is a professional emergency service and it is imperative that all emergency services have a clear under standing of each other's role and function.

"For example, the Ambulance Service is not a rescue service and ambulance crews are instructed not to enter any unsafe areas — especially those which involve dangerous substances — to treat a casualty.

"Instead they rely on the expertise of the recognised rescue services — such as the C.F.S. — to make the casualty available for them to evacuate with the assistance of the rescuers.

"In short, the effective rescue of a casualty from a vehicle accident is a combined emergency services operation.

"It is essential that each service — and that includes the C.F.S. — know and recognises the others role.

"Rescue squads must be prepared for any type of accident.

"Although every wreck is different, certain similarities can be expected and training must be extensive in every area of vehicle rescue operations.

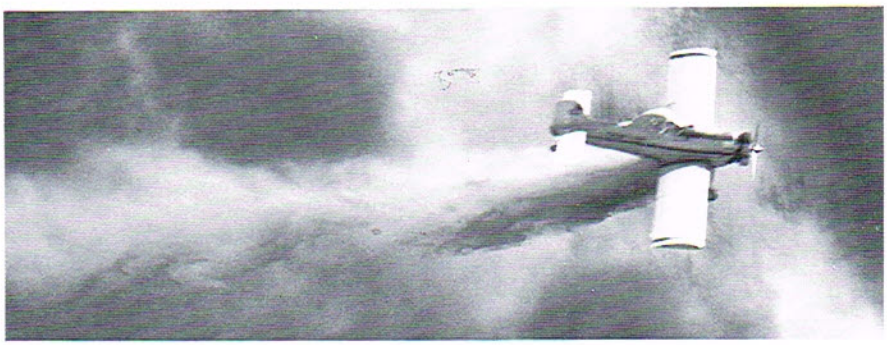
"Rescuers, machines, equipment and methods must all be co-ordinated in order to be effective and efficient.

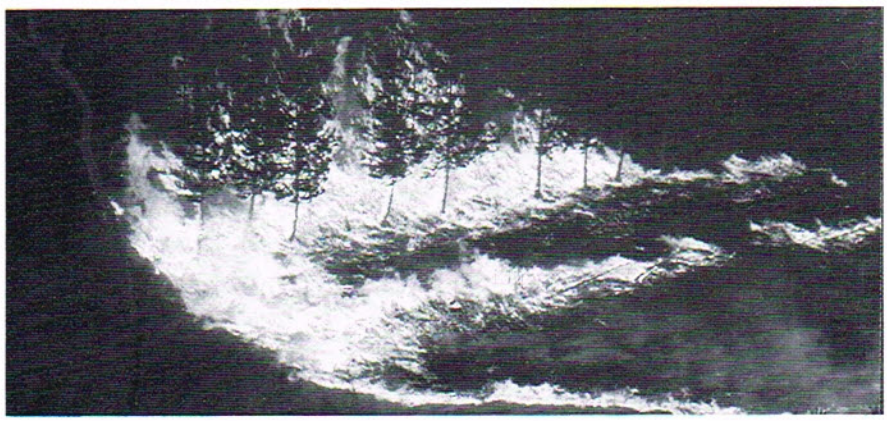
"Probably no single aspect of emergency service depends more on training and practice than learning the proper methods of extrication of casualties from a vehicle accident."

Kersbrook Fire

Wednesday 2 March — a fire was reported at 1409 hours, 3 km north east of Kersbrook. Fanned by 30 to 40 kph NW-N winds and 36°C temperature the fire quickly spread over grazing country into scrub and commercial forest. Forward control for Region 2 communications brigade and Police and St John was set up at Foreston C.F.S. Fire Station. A full scale containment operation commenced on the Northern flank of the pine forest. Resources of C.F.S., W & F and N.P. & W.L.S. numbered 44 appliances with 5 tankers and S.A. Police, St John and S.E.S. personnel, 2 bombers provided aerial support with fire retardant drops as directed by the Westpac State Rescue Helicopter. Fire fighters actions stopped the fire spreading over the power transmissions line break into adjacent forest and scrub land. The fire was contained at 1949 hours. By midnight forward control, local brigades and task forces were stood down progressively. The Gumeracha C.F.S. Group, Tea Tree Gully and Woods & Forests units patrolled the burn area and conducted mopping up operations over the next 36 hours, C.F.S. Auxiliaries provided food and refreshments through the afternoon with S.E.S. supplying a hot evening meal.

Area burnt estimated 400 ha (approx. 164 ha Commercial Forest; approx 185 ha Grazing/Pasture land).





TECHNICAL ASPECTS

Fire Fighting Foams — their application

D. Hird explains the development of foam and discusses its various applications in this article which originally appeared in "Fire Prevention", the publication of the Fire Protection Association (U.K.). — reproduced courtesy of C.F.A. "The FireMan", May 1988.

Foam was first used to extinguish flammable liquid fires in the early 1900s when foam was generated by mixing solutions of sodium bicarbonate and aluminium sulphate containing a foam stabilizing agent. This was known as "chemical foam" and was still frequently used in extinguishers until quite recently.

Although larger systems were made for tank fire protection the sheer size of the systems and the problems of maintenance made them both costly and unsatisfactory.

The general use of foam began to grow rapidly in the 1930s with the development of foaming agents and foam generating equipment which could produce foam in relatively simple equipment by entraining air. The foam so produced was known as "mechanical foam" to distinguish it from "chemical foam".

Extinguishing mechanism

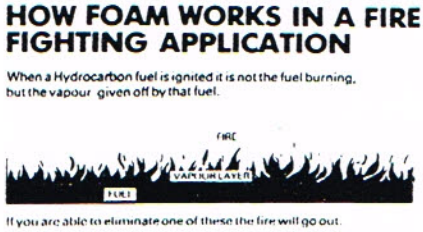
There are three main extinguishing mechanisms for all types of fire:

Cooling: by far the most common method of fire extinction and highly efficient on flammable materials with a "fire point" higher than 100°C where the high latent heat of water can be used to cool the burning material below the temperature at which it will sustain combustion.

Flame inhibition: certain substances act in specific ways to inhibit the chemical reactions which propagate flames and so extinguish them. The most common extinguishing agents of this type are dry powders and halogenated hydrocarbons (Halons). When used on flammable liquid fires, since they are active in the vapour phase, they are capable of rapid extinction of the flames. They, of course, provide no protection against reignition.

Smothering: probably the earliest method used for extinguishing fires. The mechanism being to separate the flammable vapours from the oxygen in the air required to sustain combustion. The simplest example being the use of a "fire blanket".

The mechanism of extinction of flammable liquid fires by foam is that of "smothering". Most flammable liquids cannot be extinguished by cooling and foam has no flame inhibiting properties; it extinguishes the fire by forming a coherent blanket over the surface and cutting off the supply of flammable vapours. It acts solely by providing a physical barrier between the flammable liquid and the surrounding air (fig. 1).



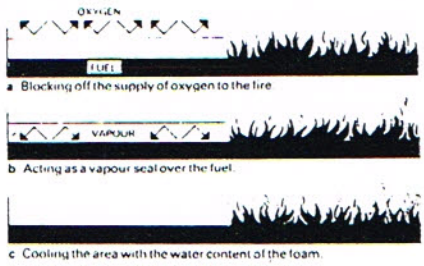


Fig. 1.

Foaming agents

Most foam compounds are used at between 3 per cent and 6 per cent concentrate in water. Some of the earliest foam stabilizing agents used in "chemical foam" were based on vegetable proteins, but with the introduction of "mechanical foams", agents capable of foaming more readily were required. It was not surprising that technologists of the time turned to foaming agents based on soap. Saponin type foam compounds were widely used in the 1930s and the first aircraft crash tenders used saponin based foams. Their main drawback was poor heat resistance.

It was during this time that research into protein based foam concentrates showed promising results and by the late 1930s the much superior heat resistance of these protein based foams meant that they were rapidly replacing the earlier saponin foams. As in many other scientific fields, foam had a burst of government sponsored scientific research during the war since the materials used at that time were largely imported.

This work, led by N. O. Clarke at the Chemical Research Laboratories, centred on the role of certain metal salts in producing efficient protein based fire-fighting foams, and laid a sound foundation for the development of many of the foam compounds we use today.

Of similar importance to the work of Clarke was that carried out at the US Naval Research Laboratories in the early 60s. During work on vapour suppressants they found that certain fluorocarbon surfactants gave a film on hydrocarbon fuels which greatly reduced the rate of vaporization of fuel. When used with synthetic foaming agents they produced a foam compound with interesting characteristics which was the basis of the aqueous film forming foams (AFFF) used today.

Developments over the last 20 years have been centred on the formulation of foam compounds incorporating fluorocarbon surfactants into both protein based foams and synthetic detergent based foaming agents to give the broad range of foams available today.

FOAM TYPES

protein based	Synthetic detergent based
Standard protein	Synthetic
Fluoroprotein	AFFF
Film forming fluoroprotein (FFFP)	
Multi-purpose FFFP	Multi-purpose AFFF

Before looking at different applications of foam it is worth examining in more detail what happens when foam is applied to a flammable liquid fire.

As foam is applied to the fire it spreads over the liquid surface and is destroyed by:

- drainage of water from the foam which thins the bubble walls and reduces their resistance.
- convection and radiation from the fire which bursts the bubbles and evaporates water from the foam.
- fuel on the foam which can also burst the bubbles.

To form a blanket over the surface and extinguish the fire the foam must be applied at a rate higher than the rate at which it is being destroyed — this critical point is known as the "critical rate of application" (fig. 2).

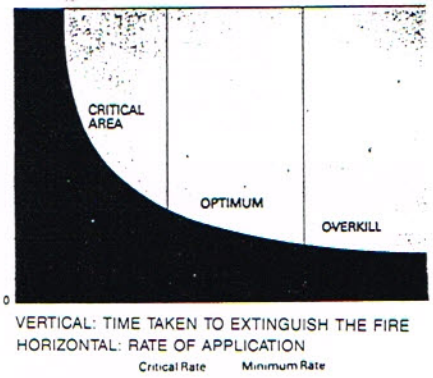


Fig. 2. "Critical rate of application."

This concept of "critical rate" is very useful in determining the resources required to protect a given risk. It is also of help in determining the "severity" of different types of flammable liquid fire and the efficiencies of different types of foam compound.

In general the lower the "critical rate" required to extinguish the fire, the more efficient the foam compound. This is a much more useful guide in many applications than the time taken to extinguish a fire.

It can be seen from looking at the three methods by which foam is destroyed that the main effect of different fuels or fire types or methods of application is going to be caused by the effect of the fuel on the foam, since loss of foam by drainage or by evaporation will not vary much.

It also highlights the problems of applying aqueous foams to water miscible fuels which have a much greater effect at the foam fuel interface. These will therefore be considered as a special case later in the article.

Continued page 11

Fire Fighting Foams — their application

Foam applications

Most foam applications are associated with the protection of potentially large flammable liquid risks and although these may be characterized in many ways it is probably most useful to consider them under three headings:

- Large spill fires.
- Deep fuel, contained fires.
- Fires in water miscible liquids.

Large spill fires

These fires are characterized by being generally shallow fires which have not been burning long before fire fighting commences. Although by far the most important and serious is the aircraft crash fire, such fires can often occur in oil and petrochemical installations.

Taking first the aircraft crash or helideck fire the most important operational requirement is to extinguish the fire quickly if lives are to be saved. Under these circumstances it is important to have a fluid rapidly flowing foam and methods of application which can distribute it very rapidly at high rates of application. This is one area where the "critical rate of application" is not important since the foam must be applied in the "overkill" region.

In the operational development of the first response rapid intervention vehicles for such applications use has been made of so called "non-aspirated" foams. The technique is to apply a film forming solution through a spray nozzle — the spray forms some foam as it passes through the air and also foams when it hits either the fuel or the aircraft surface. Such application methods give the maximum throw from the small volume nozzles which can be carried on the RIV (rapid intervention vehicle) and give the opportunity of a rapid fire knock down. The main crash fire-fighting vehicles which follow use normal low expansion foam with a preference for film-forming foaming agents, either AFFF or FFFP.

The choice of foaming agent and method of application in this instance is a balance between rapid knock down of the fire and stability of the foam.

An equally high risk is that of a helideck on an oil platform. These are generally protected by high capacity oscillating monitors using a solution of AFFF in a non-aspirated spray. For most applications to spill fires apart from these a low expansion foam with its much greater stability is the preferred method.

Deep fuel, contained fires

The most serious flammable liquid fires occur in storage tanks and normally require the greatest resources for control and extinction.

Fixed foam protection is often fitted to fixed roof tanks (fig. 3) and the larger floating roof tanks should have the rim seal protected by a fixed foam system. Under these circumstances there should, in theory, be no fires in large floating roof tanks, but records show that worldwide there are about 5 serious fires per year. A common characteristic of these fires is that they are due to some major malfunction or disaster — lightning, major accident or, in some parts of the world, terrorist action.

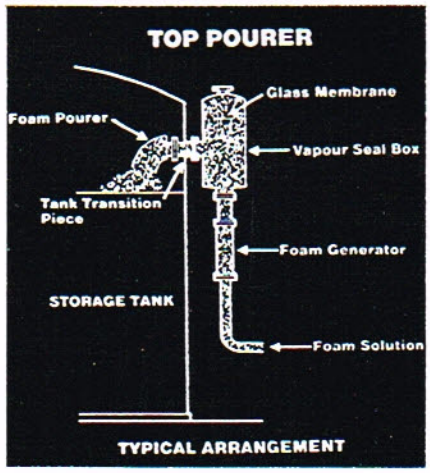


Fig. 3. Fixed foam protection fitted to fixed roof tanks.

A common factor in all these major incidences is that it is often between one and two hours before sufficient resources are available to start serious fire fighting and in a number of cases, more than 12 hours. There are two main difficulties in extinguishing these fires.

- The size of the fire means that mobile equipment cannot be positioned close to the tank because of the high levels of radiation and high capacity foam monitors are required. Even with the best equipment there will be major foam losses before the foam reaches the fuel surface.
- The fact that the foam must be projected onto the fire means that there will be considerable mixing of the foam with the fuel. In addition, the temperature of the fuel, depending on its composition, after burning for a few hours, will be high. Hot zones are formed in most hydrocarbon fuels and it has been shown that even petrol forms a hot zone with prolonged burning at the 20 per cent distillation temperature which is in the range of 70°C-80°C.

These problems are not new, although their scale has been increased by the move to very large storage tanks. One of the lessons of the wartime experience in the UK was that fires in fuel storage tanks required much higher levels of planning and logistics than were available at the time and with volatile fuels like petrol were extremely difficult to extinguish. Our experience since the war suggests that we have yet to find solutions to the problems.

The wartime experience did initiate work at Imperial College on the base injection of foam into fuel storage tanks which would alleviate the first of the problems detailed above. This work was contained at the Fire Research Station in the 1950s, but at the time the foam compounds available produced foams which did not have sufficient tolerance to admixture with fuel to make the system viable.

If base injection foam is injected at the base of the tank, if rises through the fuel and spreads over the surface to control the fire (fig. 4).

It was not until the development of fluoroprotein foams in the late '60s, with their much higher tolerance to contamination by fuel, that base injection became a useful tool in fire protection.

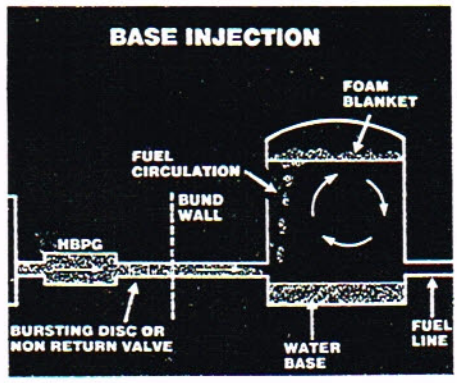


Fig. 4.

Since then many hundreds of systems have been fitted, with good experience. Although satisfactory tests have been made with other foam types it is likely that fluoroprotein foams give the best balance of fuel resistance and heat resistance for this application.

Mobile equipment is, however, likely to be the method most used in large tank fires for some time and there appears to be a need for the development of improved equipment in this field.

Also, this type of foam application does put severe requirements on the foam being used. A number of investigations[1,2] have shown that the "critical rate of foam application" can be significantly increased when foam is applied forcibly to a fire and that the critical rate is also increased for fires with long pre-burn times. Present day standards for tank protection by mobile equipment do not seem to provide sufficient safety margins and probably need reviewing. The most critical point is, however, the choice of foam compound for serious first situations. The newer film forming fluoroprotein foams (FFFP) with their exceptional resistance to contamination by fuel are undoubtedly the best choice for this application.

Fires in water miscible liquids

Water miscible fuels have a foam destroying effect, to a greater or lesser extent, on all foam types. These effects can vary widely depending, among other things, on water solubility and volatility of fuel.

While ordinary hydrocarbons do not mix with water and a stable foam blanket may be readily formed, polar solvents mix and thus tend to destroy a water-containing foam blanket.

Early development of special purpose alcohol type foam concentrates was based on the enhancement of protein foams, and relied on precipitation within the foam bubble wall to give a "structured" foam, having a very low drainage rate, and being capable of resisting the destructive effects of the fuel on the foam. These, however, are stiff and slow flowing, and tend to be highly susceptible to breakdown unless applied gently.

Subsequently, foams containing water soluble polymers were developed. These rely for their effectiveness on the precipitation of a thin polymer "skin" or membrane on the interface between the fuel and the foam (fig. 5). In this way the destruction of the foam by contact with the fuel is retarded.

continued page 12

Fire Fighting Foams — their application

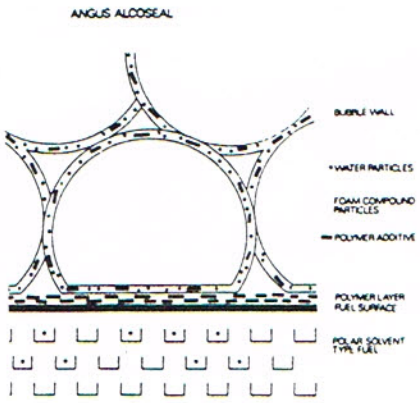


Fig. 5. Foams containing water soluble polymers.

The polymer containing types have been found to be significantly more effective than the previous structured foam types. They are capable of being applied more forcefully to water miscible fuels, give faster fire extinction while providing good levels of post fire security.

The real effectiveness of these special, or multi-purpose foams will depend both on the water solubility and volatility of the fuel and on the method by which foam is applied. The table gives a good illustration of how different polar and non polar liquids affect these foams.

It seems likely that advances will be made in multi-purpose foams so that they can be used at lower concentrations with greater resistance to water miscible fuels and be generally all-purpose foams.

In more practical terms, development of improved equipment to apply foam to fires has lagged behind the developments of improved foam compounds. There is no doubt that the most effective method of fire extinction for large flammable liquid fires is to apply a stable low expansion foam to the fire.

The technique, which has recently been advocated in some quarters, of applying a non-aspirated spray to large tank fires is more a reaction to the scarcity of good large capacity foam-making equipment than a serious solution to the problems of extinguishing large tank fires of volatile fuel.

As in many other fields there have been tremendous advances in foam technology over the last 25 years, which raises the question of what the future may hold.

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2. D. Hird, A. Rodriguez and D. Smith, "Foam — its efficiency in Tank Fires", Petroleum Review, September, 1969.

Foam Destroying Effect of Different Flammable Liquids

	Foam Destroying Action
Heptane, Gasolene, Kerosene, Avgas, Avtur, Benzene, Toluene, Xylene, Cyclohexane, Diesel Fuels, Gas Oil	***None***
Amyl Acetate, Butyl Acetate, Ethyl Acetate, Methyl Isobutyl Ketone, Di-isobutyl Ketone, Cyclohexanone, Cyclohexanol, Pentanol, Ethane Diol, Ethylene Diamine, Monoethylene Glycol, Vegetable Turpentine, Gasohol	***Slight***
Actylonitrile, Acetone, N-Butanol, Tertiary Butyl Alcohol, Methanol, Ethanol, Iso-propanol, Industrial Methylated Spirits, Methylated Spirits, Dimethyl Formamide, Ethyl Lactate, Ethylene Glycol, Monobutyl Ether, Diethylamine, Cyclohexylamine, Propylene Oxide, Diethyl Ether, Trimethylchlorsilane	***Moderate***
Ethylamine, Isopropylamine	***Severe***

Treating burns with Vitamin E: A case for wider application?

The use of Vitamin E in the treatment of burns is discussed by medical journalist and author ANNE-LISE GOTZSCHE.

In 1953 the famous American nutritionist Adelle Davis attended a meeting arranged by two Canadian doctors, Wilfrid and Evan Shute, in the Canadian town of London, Ontario. Adelle Davis, who died in 1974, spent years treating patients with diet, often in collaboration with their physicians. This meeting, however, was about burns and the healing of wounds.

The two Canadian doctors, who were brothers, were showing pictures of burns patients who had been treated with alpha tocopherol, the active principle in Vitamin E. The photographs "showed people enduring such intense agony that many viewers had to leave the room", wrote Adelle Davis later in one of her best-selling books.

"There were slides of ulcerated amputation stubs, massive varicose ulcers, and gangrenous skin grafts, all of which had refuced to heal." "A young boy, run over by a bus, his entire body covered with pus-filled wounds; a steel worker piteously burned by hot slag; children horribly burned by irons or boiling water; people mangled in car accidents; and severe radiation burns resulting from cancer treatments.

"Yet after vitamin E, usually 600 units daily, had been given to each patient and vitamin E ointment used generously in many cases, all had healed rapidly without contracting or disfiguring scars. I particularly remember a young man whose hands had been so severely burned that scar tissue had drawn them into inflexible, useless, claws; vitamin E had given him two healthy hands."

Carwash Incident

In her book *Let's Get Well* (Unwin Paperbacks, 1974) Adelle Davis also describes a case she treated herself: A young man who had suffered an accident when a pipe carrying hot steam had broken directly behind him in a car wash establishment.

"When I saw him, his entire back was a raw, oozing mass; small scabs showed in a few areas; and the itching, drawing pain of forming scar tissue was almost driving him insane. Never have I seen such a severely burned person outside of a hospital."

She treated him with the oil from vitamin E capsules as well as 200 units of vitamin E after each meal. She claims that the intense discomfort from the burn and the itching, drawing agony caused by the forming scar tissue, disappeared in a few hours. The back healed rapidly and "not a trace of a scar formed". Three weeks later he was playing football.

Vitamin E is one of a group of natural antioxidants, substances which prevent unsaturated fats from turning into toxic peroxides in the body. It decreases the need for oxygen, and doctors who use it in medical treatment think this is why the vitamin is so helpful in the treatment of burns and damaged tissue. The Shute brothers, however, also insisted that alpha tocopherol, when used as a drug and in large doses, is a powerful anticoagulant, a substance which prevents and dissolves blood clots, and because of this became embroiled in a lifelong controversy over the pharmaceutical properties of the vitamin.

Synthetic

The synthetic version is manufactured by Roche Products Ltd., but though the company has paid helpful and very careful attention to the scientific vitamin E saga over the years, it is also usually claimed by the vitamin E doctors that the synthetic version is not as effective as a good-quality natural one, because of as yet unidentified synergistic factors.

As an antioxidant alpha tocopherol has been investigated by top scientists such as Professor Denham Harman of the Department of Biochemistry at the University of Nebraska, and Homer S. Black, Associate Professor of Dermatology at Baylor College of Medicine in Houston, Texas, who looked at the ability of alpha tocopherol to protect against skin cancer in the early 1970s. Already in the 1950s vitamin E was tried in the treatment of diseases such as lupus erythematosus and other skin disorders.

Among the distinguished doctors who have tried over the years to call for further and coordinated research into the usefulness of alpha tocopherol are a leading North American epidemiologist, British-born Professor Terence W. Anderson, now at the University of British Columbia; and most recently in Britain, Dr. John Vane, Group Research and Development Director at The Wellcome Research Laboratories in Beckenham. Dr. Vane won a Nobel Prize for his discovery of prostacyclin, a natural anticoagulant and anti-clotting factor in the body.

These scientists have been more concerned with the vitamin's role in heart disease, and only the cosmetics industry and ordinary customers have explored the vitamin in treating and preventing severe sunburn and in treating household burns.

One exception is the Australian doctor, Lady Phyllis Cilento, in Toowong, Brisbane, who 15 years ago travelled all over the world to meet other doctors using the vitamin, and who has spoken highly of its effectiveness in the treatment of severe burns, wound healing, the prevention of scar tissue, skin grafting, as well as ulcers, eczema, and gangrene.

Article reproduced courtesy of "Fire" May 1988 issue.

SAFE CHEMICAL STORAGE "ESSENTIAL" ON FARMS

The sight of firefighters collapsing after inhaling fumes from burning chemicals during a fire on a nearby farm provided a valuable lesson for South-East grazier Robert Boord.

A couple ended up in hospital and others also were affected — all because they didn't know there were chemicals burning in the blaze.

After that near tragedy nearly three years ago, Mr Boord went home to his own property and built a small shed, separate from other buildings and more than 300 metres from the house.

The outside was marked with red "Hazchem" signs and inside was stored all farm chemicals and drenches, garden sprays and even polypipe.

"A lot of people think that only certain types of chemicals can give off dangerous fumes in a fire — they don't realise that polypipe and clear stock drenches are among the worst," he said.

Sound safety measures have always been implemented on the 500-ha grazing property — a legacy of Mr. Boord's position as a fire control officer for 15 years and captain of the Stewarts Range C.F.S. brigade.

Regional winner in the Rural Fire Safety Awards competition last year, Mr. Boord and his wife Jannette came second in the South-East zone judging for the 1988 awards.

Sponsored by NZI Insurance and Commercial Farmers Insurance Brokers, and supported by the Country Fire Service, the competition aims to increase fire risk awareness and lift fire safety standards in rural areas.

To maintain effective firebreaks around the property the Boords tread a fine line between fire safety and soil erosion.

The sandy soils erode quickly if over grazed, so some areas have been planted to couch grass for stability, while others are mown after initial grazing.

Firebreaks are ploughed around the property's perimeter as well as around a 160 ha area of natural scrub within the main boundary.

According to competition judge, retired C.F.S. fire protection superintendent, Mr. Bill Green, fire safety measures around the Boord house are impressive.

Three systems — an overhead pressurised water supply of 23,000 litres, a pump that can fill the tanks and work the sprinkler system, and a second pump to increase pressure in the sprinkler system — ensure the house and garden are well protected during a fire.

Raised sprinklers are designed to wet down the house walls and roof if needed, as well as the garden, the system is checked regularly and every member of the family knows how to use it.

Netting fences and belts of specially planted native trees around the house area are designed to "capture" burning debris swept along the ground or carried by strong winds — before it reaches the house.

Paddocks to the north and west of the house have been planted to lucerne, and no longer left to stubble over summer.

Fire extinguishers are kept in the kitchen, workshops and all vehicles.

"The Boords stored their house fire extinguisher where anyone could see it, and on the wall as you enter the kitchen which is an ideal location," Mr Green said.

"A lot of people put them in a cupboard or pantry because they don't like the look of them, and that's not wise.

"Many also put them near the stove which is the worst place — if there is a fire you are not going to be able to get anywhere near it."

Other fire safety measures on the property include a trailer-mounted fire fighting unit, a cleared belt of 50 to 100 metres around sheds, and strategically-placed long hose reels, always left connected and ready for use.

"As captain of the local fire brigade I would be called away if there was a fire in the district, and I'd want to know my own home was safe," Mr Boord said.

"And as a fire brigade captain I can't preach to others unless I set a good example myself."

TIDY FARM THE KEY TO FIRE SAFETY

Keeping the north approach to the house and sheds bared out during summer is an essential fire safety precaution on John and Debra Harris's property at Kadina.

The 1200-ha cereal and grazing property, which won a fire prevention award, is only a few kilometres south of Kadina — the direction from which any fire danger was likely to come, Mr. Harris said.

"The stretch between us and the town is fairly heavily settled for a rural area and that makes us and others in that stretch susceptible to fire risks in the event of strong north winds.

"To protect ourselves the paddocks to the north of our house is usually sown to oats and vetch, eaten out by sheep, and ripped up at the start of hot weather, about September. We then keep it bare until April or the start of the season.

"That way we have a substantial firebreak all summer on the most dangerous side of the house and sheds."

Fire safety measures in all areas are a feature of the property which won the Yorke Peninsula-Mid North zone section of the 1988 Rural Fire Safety Awards.

After inspecting farms entered in the competition, the judge, Mr. Bill Green, a retired C.F.S. fire prevention superintendent, said he was impressed with the tidiness of the Harris property.

"Although many properties in the north didn't have the large irrigated areas around sheds that I found among South-east entrants, they were grazed heavily or bared out to keep fire risk to a minimum," he said.

"The top entries in the northern region were very even, but the Harris's won because of their attention to fine detail.

"The area around and inside their buildings was extremely tidy and free of accumulated rubbish and they had stored their chemicals safely."

Mr. Harris said although there had never been a bad fire on the property, he was very aware of taking fire safety measures.

All paddocks on the property had ploughed firebreaks, and the area around the sheds had been fenced to allow grazing.

Heavy grazing kept the yards tidy and free of fire risks as well as reducing the amount of chemical weed spraying needed.

Many older buildings had been replaced by large modern sheds, positioned so a fire in one would not be able to spread to another.

Chemicals were stored in an old raised barn, not accessible to children and isolated from other buildings.

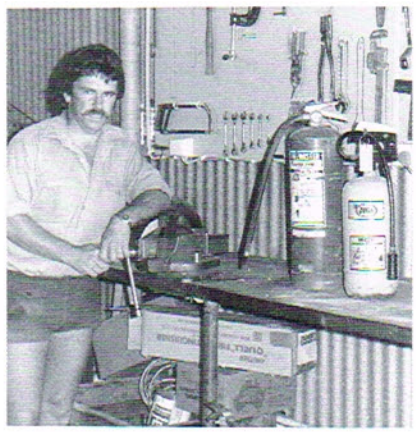
All used chemical drums were flattened and dumped at the local rubbish tip to reduce hazards on the property and to ensure they could not be re-used.

The house was surrounded by lawn on three sides, and brick paving on the fourth side, and fire extinguishers were kept in all vehicles, the workshop and house.

A trailer-mounted, 750-litre capacity fire fighting unit was kept ready at all times, and a second unit would be bought with prize-money from the competition win, Mr. Harris said.

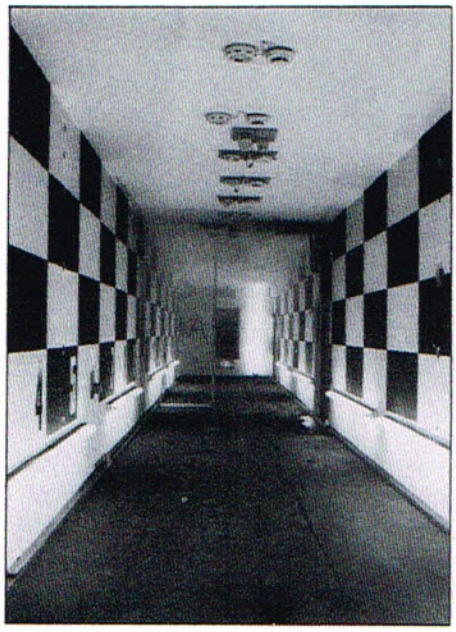
"The main fires we get in this area are during harvest. Inside airconditioned headers or tractors you can't smell a burning belt or cog as you could in open vehicles.

"But most farmers are conscious of this danger, keep an eye out for anything going wrong and have at least one fire fighting unit in the paddock during reaping," he said.

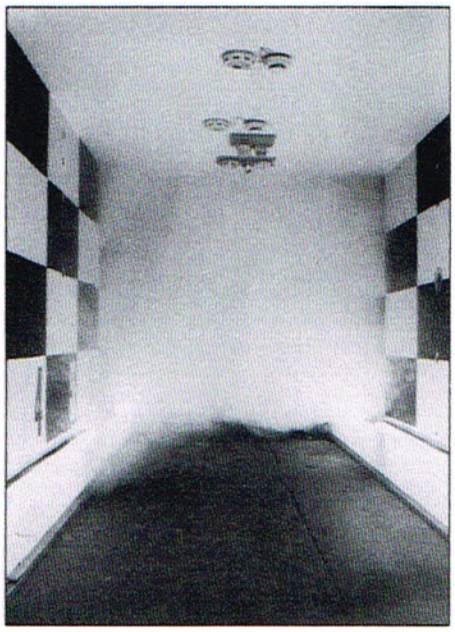


John Harris keeps both water and foam type fire extinguishers in the workshop/machinery shed on his Kadina property as an added fire safety precaution.

Smoke Detection in Corridors



Escape route usable



Escape route unusable

Over a three-year period the Fire Research Station Borehamwood, at Hertfordshire in England has been studying the behaviour of smoke in corridors in order to determine the optimum siting of smoke detectors. British Standard 5839: Part 1: 1980 (amended 1982) recommended that the protection of escape ways in residential premises could be achieved by the use of smoke detection systems in the corridors, provided that no point on the ceiling was further then 7.4 m from its nearest detector.

The assumption was that in the event of a fire in one of the rooms, even with a closed door between the room and the corridor "hot" smoke would leak into the corridor, move along the ceiling and activate a detector long before the escape route became completely blocked by smoke.

Concern was expressed as to whether the 7.5 m spacing could offer sufficient protection against smoke entering a corridor from fire in a room whose closed door could be 7.5 m from the detector.

FRS built an experimental rig at its Cardington laboratory consisting of a 20 m long corridor with two fire rooms attached to it — one at the end and one in the middle. The corridor was 2.4 m wide by 2.5 m high and each room 2.7 m square by 2.5 m high with a 1.2 m × 1.35 m opening which could be partially blocked off to provide variable ventilation.

In order to facilitate video and still photography during the experiments windows were placed at each end of the corridor and opposite each fire room door. Detectors were mounted at intervals in the corridor and monitoring equipment provided for temperature, smoke density and detector operating times. Investigations were made into the effects on leakage and movement of smoke in the corridor due to:

- change in the rate of fire-growth due to differing amounts of ventilation
- different types of door and different sizes of door crack
- insulation on the corridor ceiling
- high and low level lighting in the corridor
- heating in the corridor

At one extreme it was found that with fire doors and slow-developing fires, i.e. with restricted ventilation, the smoke leaking into the corridor was "cold" and "heavy", initially dropping to the floor and moving along the corridor near floor level. It did not reach the ceiling for a considerable period and detection was significantly delayed. At the other extreme, rapid detections were achieved with domestic doors and fully-ventilated fires, but the corridor quickly became smokelogged.

In the majority of the experiments three smoke detectors protecting a 20 m long corridor (as in BS 5839) could provide reasonable escape times of more than 10 min. Since life safety is involved the worst case must be considered, and situations were identified where a three-detector system could provide only 3 min for escape.

With domestic doors the time between the start of smoke leakage into the corridor and the completion of smokelogging could be as low as 6 min and detection in the corridor alone would be insufficient. In some tests heat detectors were installed in the fire rooms and these always operated before any smoke was visible in the corridor, providing at least 9 min for escape.

As a result of this work, FRS advised that for adequate fire protection of a room and corridor complex, heat or smoke detectors would be needed in the rooms, coupled with a smoke detection system in the corridor.

This recommendation has been accepted and incorporated into the new edition of U.K. Building Standard 5839.

BITS 'N PIECES

Government Cup

The prestigious perpetual Government Cup is awarded annually to the 'A' Grade Hose and Pump Drill Championship Team.

Goolwa Appliance

Dean Ostigh Goolwa C.F.S. Brigade Captain took delivery of new $100,000 fire appliances from Region 1 O.I.C. Chris Martin at a ceremony on 12 March 1988.

BITS 'N PIECES

Cherry Gardens C.F.S. win Barrow Push

In only their second entry, the Cherry Gardens C.F.S. "Cherry Pickers" have won the great "Broken Hill to Burra barrow push."

In so doing, they set a new race record, and also won $11,000 for the brigade.

The "Cherry Pickers" completed the race in 15 hours 32 seconds, which knocked 14 minutes off the previous record.

They also broke the winning streak of the "Dampier Salt Shakers" from Western Australia, who won the race in 1983, 1985 and 1986.

This year they had to be content with second place with a time of 16 hours 36 minutes — one hour four minutes behind the "Cherry Pickers."

Mr. Geoff Lewis, the team's publicity officer, said the Cherry Gardens team was lucky in avoiding injury, as most of the other teams entered in the gruelling five-day event lost men during the race.

This year the team comprised six firefighters — Brenton Gardner, David Brazel, Warren Partland, Mark and John Selga, and Pat Custance.

The direction of the race alternates. This year it began at Burra and competitors ran the 355 km to Broken Hill.

Over the five-day period, each day's distance varied between 48.3 and 94.1 km, taking from two to about four hours.

Each runner pushes a wheelbarrow containing 30 kg weight, including a pick, shovel, axe, bar, two blankets, two billies, two bottles of beer, water, flour, salt, tea and sugar — similar to the loads carried by miners in the early days.

No miner travelled at the pace of these competitors, however, who ran for only 10 seconds each, after stepping off their support vehicle at 24 to 25 kph.

On uphill stretches, they changed over more frequently, running for only four seconds at a time.

The whole procedure is very demanding on the runners and coach Ray Hardwick Senior has had them training at meadows each Sunday for the past three months, following track work twice a week.

Mr. Lewis said the secret of winning was to end the race with six runners — not easy in 40 degree plus heat. A run could result in a weight loss of 2½ kilos.

The $11,000 prize money will go towards the running costs of the brigade.

Reproduced courtesy 'Mount Barker Courier'.

Congratulations Cherry Gardens C.F.S. on a brilliant win. We could use your stamina and skill at the 1988 C.F.S. Combined Regions 1, 2 & 3 Fire Fighting Drill Competitions to be held at Mt. Barker on 17 July.

WANTED

Coventry Climax Motor

FWVP or FWE 1261 cc type, in sound running order.

Contact Mr. Brian Hannaford
Phone: wk: (08) 223 2277
ah: (08) 271 7538

Radio Communications Equipment Museums

Headquarters communications staff have become aware of two collectors seeking out sources of older radiocommunications equipment, which may have been used by the E.F.S. or C.F.S. over postwar years.

One collector, Mr. Tony Bell, is seeking wartime army (or other services) equipment. Such items as FS6, 101, 108 sets used in the initial postware mobile E.F.S. installations, may be gathering dust in some council shed, and with restoration, could be suitable for display. Tony is on the executive of an Army Vehicle Preservation Society, whose aim is to restore for display all types of vehicles, with their appropriate accessories, used by the Army throughout the years. Old radio maintenance handbooks are also in demand for such displays.

Another group presently establishing a commercial radiocommunications equipment museum is the Radiocommunications Group of the Institution of Radio and Electronics Engineers (Australia). The president, Gordon Best, is seeking information on earlier equipment that may have been used by E.F.S. or C.F.S. such as Traeger, Harbros, Farmer, etc. throughout the years.

Apart from identifying potential sources of these transceivers, Gordon would be particularly interested in cassette recordings or notes from pioneer users of these units, detailing their experiences — also any handbooks, photographs or newspaper reports of their use in fire fighting activities. Also of interest would be records of any life-saving application of radio in these earlier years.

Any Volunteer who was associated with the use of the above types of equipment and knows of any possible sources from where they may be recovered, would be of great assistance to these collectors.

Both are employed in the radio-communications industry and may be contacted through Rob Gurr, or Communications staff, C.F.S. Headquarters Communications Unit on (08) 297 6788.

Smoke's No Joke

With the prices of oil, gas and electricity rising, the use of firewood for heating and cooking has increased. Wood heaters and solid fuel stoves are capturing a significant proportion of the Adelaide home-heating market.

However, this change in fuel use has lead to an increase in air pollution complaints.

Many people do not use their wood fires properly and upset their neighbours by creating smoke and causing discomfort.

The Department of Environment & Planning has produced a leaflet called *Smoke Is No Joke.*

The leaflet provides guidelines on how to correctly use wood heaters. It covers areas such as buying and storing wood, starting and maintaining fires, design features and installation of wood heaters.

Copies of the leaflets are available from the Community Information Service of the Department, on (08) 216 7860.

State Championship Accommodation

The 1988 Country Fire Services State Fire Fighting Drill Championships will be held at Tilley Recreation Park, Yatala Vale from 1100 hours on Sunday 28 August.

C.F.S. Brigade families and brigade team personnel planning to attend may require local accommodation. A list of hotel/motels adjacent to the venue are recorded below.

Accommodation Guide

- Clovercrest Hotel/Motel
  450 Montague Road, Modbury North.
  Phone (08) 264 5266
- Fairview Park Hotel
  341 Hancock Road, Fairview Park
  Phone (08) 251 1588
- Highbury Hotel/Motel
  1017 Lower North East Road,
  Highbury. Phone (08) 264 2233
- Highlander Hotel/Motel
  647 North East Road, Gilles Plains
  Phone (08) 261 5288
- Modbury Hotel/Motel
  989 North East Road, Modbury
  Phone (08) 264 2244
- Old Spot Hotel
  1955 Main Nth Road, Salisbury Hts
  Phone (08) 258 2096

Lightweight Dam uses Gravity Trick

An Auckland company in New Zealand has developed an answer to the problem of supplying an easily transportable water reservoir for such purposes as fire fighting, stock watering or irrigation.

Called the Flexidam and manufactured by Structurflex, the reservoir seemingly defies gravity to retain its liquid load — but collapses when empty into an easily handled carry bag for re-use elsewhere.

Made in a range of standard sizes from 2,200 to 25,000 litres, which can be handled empty by one or two men, the Flexidam can also be designed and custom made with a capacity as big as 350,000 litres — above this size the dam becomes a small lake and wave action can cause loss of the liquid.

The secret to the Flexidam's anti-gravity trick is the floatation collar, which runs around the top of the dam, lifts the sides as it fills, and supports the weight of a filling hose.

Uses include water storage for fire fighting, the temporary storage of chemicals during an emergency, irrigation storage, and the storage of a wide range of other liquids.

The dams can be fitted with a range of standard hose couplings on an outlet valve near the base so that liquid can be drawn off as required, and the dam has been specifically designed to be used in conjunction with the fire services aerial fire bombing equipment.

The manufacturers claim the Flexidam is fully repairable and the makers supply a simple glue and patch kit and easy instructions. Extras include a debris cover and groundsheet/carrybag.

Article reproduced courtesy 'New Zealand Fire Service Review', February 1988 issue.

ADOPT-A-FIRE CREW

An idea Schools and C.F.S. Brigades may wish to adopt

Tony Pollifrone, Summertown C.F.S. shows a school student how to operate the fire appliance hose nozzle.

Who ever heard of adopting a group of ten adults?

Well, that's exactly what happened in the U.S.A. when a local Kindergarten got involved with the Fairfax County Fire and Rescue Department.

A kindergarten class of 26 children from Fair Hill Elementary School ably assisted by their teacher Ms. Suzanne Bailey chose to get involved with the fire fighters because of the short walk from the school to the fire station.

So they simply adopted their own B-Shift at Fire Station 30.

The groups were first introduced to each other in September 1987 when the fire fighters were invited to the school for a tour and look at how a typical pre-school day went by. The children then got the chance to visit the fire station and learn some fire fighting tips from the fire fighters.

These mutual visits were the beginning of a long friendship.

The groups have since gotten together on many occasions. The fire fighters were invited to help carve pumpkins children had picked for Hallowe'en, and to participate in a "Pow-Wow" thanksgiving celebration. The children next helped make a pot of soup at the fire station, which was eaten by all two days later at school on tiny chairs and tables. Children helped fire fighters decorate a large Christmas tree with home made ornaments made by each child. This was followed by a scavenger hunt for "Gingerbread men", with clues which lead to the fire station. More activities are planned with both groups thinking of new fun ways to interact.

By being an "adopted family" for their kindergarteners the fire fighters are proving that they go that extra mile to participate with and are part of the community. This way the children will grow up with a good attitude towards fire safety and the fire fighters.

Region 8

Training School Face Lift

Mobilong's Training Facility in Murray Bridge is currently undergoing an external repaint following assistance in acquiring the materials to do so. The labour is being provided by the Community Service Order Scheme as run by the Department of Correctional Services.

VOUNTEER MAILING LIST

Dear Reader,

If you wish to *Receive* or *Cancel* your bimonthly journal "Volunteer"* or wish to advise of a *Change of Address* please complete and return this section immediately to: "Volunteer", c/o Country Fire Services, P.O. Box 312, Goodwood, S.A. 5034.

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FIRE SERVICES TRAINING CENTRE
BROOKWAY PARK
Brookway Drive Campbelltown, S.A. 5074
Telephone (08) 337 6858

REGIONAL OFFICES:

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P.O. Box 656, Gawler, S.A. 5118.
Telephone (085) 22 6917
Telephone (085) 22 6827

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P.O. Box 519, Murray Bridge, S.A. 5253.
Telephone (085) 32 6777
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P.O. Box 8, Naracoorte, S.A. 5271.
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Telephone (086) 42 2399

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25 Washington Street
P.O. Box 555, Port Lincoln, S.A. 5606
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STIRLING
6 Druids Avenue
P.O. Box 197, Stirling, S.A. 5152
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