

L. E. MILLER

FIRST AID ORGANISATION OF THE GOLD MINING INDUSTRY OF THE WITWATERSRAND

The organisation of the first aid in the Witwatersrand gold mines is described. Special chapters treat the training in first aid of Europeans and Natives and the programmes of the courses (general and elementary) are discussed. The contents of the first aid box is also described.

The Gold Mining Industry of the Witwatersrand, Transvaal, employs approximately 35,000 Europeans and 300,000 Natives.

When it is borne in mind that mining of any description, and particularly deep gold mining, is a hazardous occupation, it will be appreciated that first aid to the injured must play an important part in the efficient working of the industry. The fostering of first aid has always had the keenest consideration of the Gold Producers' Committee, which is the controlling body of the Gold Mining Industry. Money has been freely spent and every inducement has been given to employees, both European and Native, to take up first aid, with the result that over the years first aid on the mines has developed into an efficient organisation. It is an organisation which is responsible for the welfare of nearly 350,000 workers who are exposed to the risk of injury. That this organisation does its work well is beyond doubt, as proved by the numerous instances where a life has been saved by the prompt arrest of haemorrhage or by the efficient application of artificial respiration. The First Aider on the Gold Mines has developed into an individual whose qualities are quite singular. He is courageous and resolute and will render first aid under conditions where his own life is often in jeopardy. Brave acts are done daily by our First Aiders, both European and Native: They are done as a normal part of their daily work — without fuss and without thought of self.

In 1910 the death rate due to accidents on the Gold Mines was 4.21 per 1,000 per annum. The death rate in 1949, as given by the Government Mines Department, was 1.53 per 1,000 per annum. This very impressive decline in the death rate is in a great measure due to better mining conditions and greater safety measures following on the activities of the Prevention of Accidents Committee of the Transvaal Chamber of Mines: But there is no doubt that improvement in first aid organisation and efficiency must also be given credit for saving some of the lives.

It is fitting that at this stage mention should be made of certain persons and bodies who were responsible for the building up of the first aid organisation on the Gold Mines of the Witwatersrand. First and foremost is the name of the late Dr. Louis G. Irvine. He might almost be called the father of the first aid movement in South Africa and certainly the doyen of first aid on the Gold Mines. Prior to 1921 first aid in South Africa was taught through the medium of the British Red Cross Society's First Aid Manual. As far back as 1913 it was realised that, especially as far as mining was concerned, the British Red Cross book was unsuitable. Dr. Louis G. Irvine, who at that time was a member of the South African Red Cross Council, was requested by that Council to write a book on first aid, with special reference to mining. In 1921 the South African Red Cross Society published the first edition of Irvine's »First Aid and Rescue Work in Mining« in two parts: Part I comprised the General Course in first aid and Part II comprised first aid and rescue work in mining. A large portion of Part II deals with accidents due to poisonous gases met with underground and rescue work underground.

Other names which stand out when considering the building up of the first aid organisation of the Gold Mines are Major General A. J. Orenstein, Chief Medical Officer, Rand Mines, Limited and President of the South African Red Cross Society in 1933; the late Dr. H. T. H. Butt, at one time Senior Medical Officer to the Randfontein Estates Gold Mining Company and the late Dr. A. Frew, at one time Senior Medical Officer to the East Rand Proprietary Mines, Limited. To all these and many others, tribute must be paid for the time they gave and the important parts they played in laying the foundation of the first aid organisation of the Gold Mining Industry.

The Prevention of Accidents Committee of the Transvaal Chamber of Mines, since its formation in 1913, has been intimately associated with, and is very largely responsible for, the successful building up of the first aid organisation on the mines. The Committee includes representatives of various Government Departments, such as Mines and Public Health, as well as representatives of the Mining Industry, the Medical fraternity and the Rand Mutual Assurance Company of the Transvaal Chamber of Mines. Although the main object of the Committee is to devise ways and means for preventing accidents through investigation and promotion of safety measures, the Committee is closely concerned with the organisation of first aid. It works in close co-operation with the South African Red Cross Society, and all teaching of first aid and the conduct of ambulance competitions on the mines is under the auspices of the Society. All certificates for proficiency in first aid are issued by the Red Cross Society.

The Transvaal Mine Medical Officers' Association has played a very important part in the organisation of first aid in the industry.

Its members are employed wholly in the mine hospitals owned by the industry and in that capacity come into constant contact with casualties sustained underground. The very nature of their work is closely bound up with first aid and they are acutely conscious of the important part which first aid plays in the ultimate successful handling of a casualty. In matters pertaining to first aid, it is largely on the advice given by the Transvaal Mine Medical Officers' Association that the Prevention of Accidents Committee and the South African Red Cross Society are guided.

Teaching of First Aid

When it is realised that during the year 1950, 3,522 Europeans and 37,791 Natives (Negroes) were trained and examined in first aid on the mines, it will be appreciated that the handling of such a large body of potential First Aiders requires a considerable number of lecturers, demonstrators, etc. The bulk of the practical instruction is done by the mines' lay ambulance officers. In the training of Natives, where the number of which is more than ten times that of the Europeans, the ambulance officers are assisted by Native Clerks and Boss Boys (Native Foremen), who hold the South African Red Cross Society's certificate of proficiency.

There are three courses of instruction in first aid:

- (I) General Course.
- (II) Elementary Practical First Aid for Miners.
- (III) First Aid for Mine Natives.

General Course

The basis for this course is Dr. L. G. Irvine's book »First Aid and Rescue Work in Mining«. By Government regulation the course is compulsory for all underground officials and certain officials employed on the surface. The syllabus consists of eight lectures, and demonstrations. Classes are made up of about 25 pupils, but not more than 30. The pupils are given lectures and demonstrations on elementary anatomy and physiology; the first aid treatment of haemorrhage; shock; wounds; infection; fractures; the causes and first aid management of concussion and compression, of heat stroke and heat collapse. They are taught how to do artificial respiration (Schaefer's, Howard's and Sylvester's methods), and how to deal with electrical accidents, burns, eye injuries and poisons. The last lecture deals particularly with mining accidents. The importance of dressing small wounds is stressed. Blasting accidents and falls of rock are dealt with. Gassing from fumes of explosives and the first aid treatment is described. The effects of carbon monoxide, carbon dioxide, nitrous fumes, black damp, after damp are referred to. The lectures, which last about an hour, are given by a medical man, usually a mine medical officer. The lecture is followed by a practical demonstration in first aid based on the subject of the lecture. This demonstration is given by a mine ambulance officer and also lasts about an hour.

On the completion of a course of lectures, the candidates are given a practical and oral examination by a medical man: 50% of the marks are required for a pass. The successful candidate is then granted a certificate of competence in first aid by the South African Red Cross Society, which is valid for 3 years.

A candidate who has passed the General Course can after an interval proceed to a higher examination in first aid, for which he is awarded a Silver or Gold Medal, in accordance with the proficiency displayed. A more detailed knowledge of first aid and ambulance work is required, and the ability to convey this knowledge is considered essential. Demonstrators and ambulance officers are usually in possession of the Silver or Gold Medal.

As a general inducement to take up first aid, a bonus of 30/— is paid to each successful candidate by the mines.

Elementary Practical First Aid for Miners

With the object of encouraging miners other than officials to take up first aid, the Chamber of Mines, in co-operation with the South African Red Cross Society, introduced in July 1936 an elementary practical first aid course for miners. Instruction in this course is purely practical and is based on the book »Elementary Practical First Aid for Miners«, published by the Prevention of Accidents Committee and authorised by the South African Red Cross Society. The course is intended for those who would perhaps find it difficult to follow the lectures as prescribed in the more advanced general course but who, nevertheless, are keen to learn first aid. Apprentices and pupils at the Government Miners' Training Schools also take this course, and for these it is compulsory.

The syllabus consists of eight demonstrations on elementary first aid. Instruction is concentrated on the simple essentials of first aid which resolve themselves into (1) Control of haemorrhage, (2) How to perform artificial respiration, (3) Treatment of shock, (4) Treatment of wounds, (5) Treatment of fractures.

The demonstrations are given by a lay demonstrator, usually a mine ambulance officer, and the candidates are examined by a medical man. The South African Red Cross Society issues certificates of competence in Practical First Aid and the mines give a bonus of 30/— to the successful miners as a token of encouragement. The certificates are valid for 3 years.

First Aid for Mine Natives

This is a course of elementary practical first aid in its simplest form for the native workers who form the large majority of First Aiders in the mines. Instruction is based on the late Dr. H. T. H. Butt's book »First Aid Illustrated« (Ikusiza Aba Limele), published by the Prevention of Accidents Committee and authorised by the

South African Red Cross Society. It is similar to the »Elementary Practical First Aid for Miners« and is purely practical, consisting mostly of photograph of native workers on whom the various first aid procedures are demonstrated. The vast majority of Negro mine workers are illiterate, so that the text is reduced to a minimum; what little text there is written in three languages and merely describes the pictures illustrating the various first aid procedures. As in the miners' elementary course, instruction is concentrated on the practical application of first aid. Special emphasis is laid on the importance of dressing small wounds to minimise the risk of sepsis.

The last lesson is a talk on health and safety. The rural Native who comes to the mine knows little of even elementary hygiene and sanitation, the spread of disease, etc. This lecture is given with the hope that during this stay on the mines, usually for a contract of three, nine or twelve months, he will absorb some of the principles of hygiene and that when he returns to his home he will spread the knowledge he has gained on the mines to the benefit of his family and his people.

The whole course consists of 10 lessons and practical demonstration extending over four to six weeks. Instruction is given by the mine ambulance officer or a demonstrator assisted by natives qualified in first aid. The Native is a quick and enthusiastic pupil and it is amazing how quickly he learns. At the end of the course the candidates are examined by a mine medical officer and the successful ones are given the South African Red Cross Society's certificate of competence in Practical First Aid, plus a badge with the Society's emblem. This badge they wear at work and is a means of identifying a qualified First Aider. The certificate is valid for 3 years and entitles the holder to a bonus of 5/— per month during his employment.

It is the policy of the Gold Mining Industry that all »Boss Boys«, i. e. natives in charge of a gang of 10 to 15 workers, all locomotive drivers and other natives doing certain types of more skilled work, should be in possession of a valid first aid certificate. The aim is to have not less than 10% of the underground native workers trained in first aid.

Because the native employees form the great majority of workers in the mines and because they are more exposed to injury than the Europeans, who act mostly in a supervisory capacity, it follows that most of the casualties must be amongst the natives, and also that most of the first aid is done by natives. That they are good First Aiders there is no doubt. The way that casualties are handled and dressed by natives underground is a real tribute to the way first aid has developed in the Gold Mining Industry. They handle their patients with skill and understanding. They appreciate the fact that it is just as important to dress small wounds as it is to dress large

wounds, and they have thus contributed in no small way to the decrease in the rate of sepsis which has taken place over the last 20 to 30 years. It is no exaggeration to say that the native First Aider is a capable of handling a major injury as well as any trained European First Aider.

Importance of first aid in the control of sepsis

A most important result of the development of first aid in the Mining Industry is the drop in the incidence of sepsis. The underground conditions of humidity and temperature, plus the absence of sunlight, are ideal conditions for the growth of organisms, and it is to be expected therefore that wounds, however trivial, are bound to become infected in the absence of immediate first aid treatment.

Thirty odd years ago, when first aid efficiency and organisation had not reached the high standard it has to-day, sepsis following underground injury was rife, and mine hospitals were full of this type of casualty. Gas gangrene and amputations due to sepsis were frequent and deaths due to septicaemia were all too common. To-day the picture has completely changed and a case of gas gangrene or a death from septicaemia is a rarity. The improvement, of course, cannot be attributed wholly to first aid, but the fact that the drop in sepsis set in long before the advent of antibiotics is proof that first aid was a prime factor in the downward trend.

First aid organisation of a mine

The first aid »set up« of a certain mine whose complement is about 1,300 whites and 10,500 natives can be taken as typical of the first aid organisation of an average gold mine on the Witwatersrand.

The ambulance officer is in direct charge of first aid. He is responsible firstly, to the Manager for the general organisation of first aid and secondly, he is under the technical control of the medical officer, through whom all equipment is ordered. The ambulance officer may have one or more assistants, depending on the size of the mine.

In order that first aid shall be available to all accident cases, certain European officials and native First Aiders are appointed. They are placed throughout the mine so as to ensure equity in the distribution of first aid personnel. There is a »First Aid Station« at each »Main Station«. The mine described here has 43 Main Stations and therefore 43 First Aid Stations. The First Aid Station is the responsibility of an underground official who must hold a valid First Aid Certificate. Each First Aid Station is equipped with 2 Government Regulation »First Aid Boxes«, 4 blankets and 2 stretchers. Ampoules of trichlorethylene and inhalers are available on some mines at certain Main First Aid Stations. This analgesic has been found

invaluable in cases of severe injury, giving the patient great relief from pain during his transport to hospital. The patient administers the drug to himself, under the supervision of the ambulance officer. Oxygen and carbogen cylinders, with masks, are also kept at these points, as well as at the ambulance rooms at all shaft heads.

Every underground official carries on his belt a small leather or metal box, containing 1 medium and 1 small size sterile dressing in waterproof wrappers, and a 1 ounce bottle of 1% mercurochrome or other aqueous antiseptic. The use of tincture of iodine has been abandoned on account of the irritation which it so frequently produced.

On duty at each First Aid Station is a qualified native First Aider. He attends to casualties which are brought to the station and is occupied wholly with first aid work and the care of the station. All native Boss Boys carry in a metal box attached to the belt the same dressings as European officials. They are certificated First Aiders and comprise about 10% to 15% of native underground workers.

In addition to the Main First Aid Stations, there are distributed throughout the mine, where gangs are working, *Intermediate First Aid Points*. At these »points« small first aid boxes are provided, containing antiseptics and dressings. The box is carried to the working place at the beginning of the shift by the Boss Boy in charge of the gang. He attends to minor casualties in his gang. At the end of the shift he takes the box to the surface where it is refilled at the shaft head ambulance room.

Each first aid packet contains a paper slip on which particulars of the casualty that has been dressed are written. To keep a check on casualties and to obviate the misuse of dressings, these must be produced to the ambulance officer or his deputy at the shaft head before they are replaced.

In the case of a major casualty, the necessary equipment is taken from the Main First Aid Station to the scene of the accident and first aid is rendered on the spot, if possible. Such a case is then taken to the Main Station and sent directly to the surface, whence he is removed by ambulance to the hospital.

The ambulance officer frequently proceeds underground to attend personally to serious cases.

Minor injuries to natives receive further attention at the *Compound Dressing Station*. These dressing stations are situated at the entrance to the compounds, where the native workers are housed. Every native with a minor injury, whether it is an injury freshly sustained or an old one, must pass through the dressing station. New injuries are re-dressed and old ones are examined and, if necessary, re-dressed. A card index system is used to keep a record of every case attended to. Europeans with minor injuries are re-dressed at the shaft head ambulance rooms.

Surface First Aid

Although the organisation of first aid is mainly for underground where the majority of casualties occur, provision is also made for casualties which occur on the surface. Of the complement mentioned above, 1,800 natives and 629 Europeans are employed on the surface, working in such places as fitting shops, boiler-maker shops, drill shops, carpenter shops, etc., and in the gold extraction works. At points like the boiler and fitting shop, where the greater number of casualties are likely to occur, Government Regulation First Aid Boxes are available. All other workshops are supplied with boxes containing sterile dressings in cellophane, elastoplast, antiseptic, sal volatile, cotton wool and a tourniquet.

All foremen in charge of workshops must hold a valid First Aid Certificate.

At each shaft head there is an ambulance room. It is equipped with a bed for casualties awaiting transport, two stretchers and the usual first aid equipment. Although used mainly for casualties from underground, injuries occurring on the surface in the neighbourhood of the shaft head are handled at the ambulance rooms.

When not on duty underground, the ambulance officer is on call at the ambulance room. On permanent duty at these rooms are qualified native First Aiders.

At the Reduction Works, where cyanide is used in the extraction of gold, officials must have knowledge of the treatment of cyanide poisoning. In their lectures on first aid they are taught the use of the stomach tube and how to proceed in a case of cyanide poisoning. A box containing the outfit for treating poisoning by cyanide, together with full instructions, is kept at each Reduction Works.

Ambulance Competitions

In addition to the training of the individual in first aid work, the Prevention of Accidents Committee of the Chamber of Mines encourages the training of teams, both European and Native, in ambulance work. The teams so trained take part in yearly ambulance competitions. These competitions it is felt encourage first aid amongst the workers by stimulating a healthy interest and friendly competitive spirit. Great interest is shown by the mining community and the general public. They are usually held on Sundays and are attended by hundreds of spectators, both European and Native.

Teams are made up of 5 members, and each member must hold a valid certificate in first aid. One member acts as the patient. The tests are set by the South African Red Cross Society and only standard first aid equipment is used. Teams pass three separate tests. In the first test each member of the team is given a practical test in first aid which he must complete in ten minutes. In the second and third tests, each team is given a test which the team performs as a unit. The test must be completed in ten minutes.

In 1950 424 European and 2,123 Native teams took part in ambulance competitions, i. e. 2,120 Europeans and 10,615 Natives.

Rescue Work in Mining

First aid and »rescue work« run pari passu and mention must therefore be made of this very important branch of the first aid organisation.

The essential conditions for effective rescue work are thorough training and organisation. On account of the very strenuous and difficult conditions under which they might have to work, the men are specially selected as regards physical fitness and temperament. They are subjected to a fairly rigorous initial medical examination and are re-examined at six monthly intervals. Training is carried out at a Central Training Station and the men perform exercises under conditions as near as possible to the conditions they are likely to encounter in reality. The men must have a thorough knowledge of their breathing apparatus, because it is only thus that they will have confidence in the wearing of it. The »Proto« oxygen breathing apparatus is used by the rescue teams of the Witwatersrand Gold Mines. The trained men connected with local stations are grouped in teams of five with a sixth man as reserve. The members comprising a team practice together and are available for rescue work as a team.

In addition to lectures and demonstrations in fire fighting and rescue work, detailed lectures are given on gases met with in gold and coal mines.

The Government Regulation »First Aid Box« is a metal box measuring 1 ft. 11¹/₄ inches × 1 ft. 3 inches 5 ⁵/₁₆ inches and in it are: —

- Set of first aid splints.
- 2 tourniquets.
- 18 triangular bandages.
- 1 dozen large and 1 dozen small first aid dressings.
- 1 lb. compressed tow.
- ¹/₂ lb. compressed wool.
- Roll of picric lint.
- 1 dozen safety pins.
- 6 2 ounce bottles of emetic.
- 6 2 ounce bottles of stimulant.
- 1 bottle of tincture of iodine.
- 1 pair scissors.
- 1 medicine measure.
- 4 1 ounce packets of compressed lint.

* Iodine is included under the old regulations but is not used.

*Rand Mines, Ltd.
Health Department,
Johannesburg*

ORGANIZACIJA PRVE POMOĆI U RUDNICIMA ZLATA U WITWATERSRANDU

U witwatersrandskim rudnicima zlata u Transvaalu zaposleno je otprilike 35.000 Evropejaca i 300.000 urođenika.

S obzirom na to, da je svaki rudarski rad, a naročito duboko kopanje zlata, opasno zanimanje, jasno je, da prva pomoć unesrećenima treba da igra važnu ulogu u uspješnom radu tih industrija. Komitet proizvođača zlata, upravno tijelo Rudnika zlata, uvijek je davao veliku važnost promicanju prve pomoći. Nije se štedjelo na novcu i poticalo se na sve načine namještenike — i Evropejce i urođenike — da sudjeluju u organizaciji prve pomoći, tako da se u toku godina prva pomoć u rudnicima razvila u efikasnu organizaciju. Ta se organizacija brine za gotovo 350.000 radnika, koji su izvrgnuti opasnostima ozljeda. Nema sumnje, da ta organizacija vrši svoj posao dobro. To dokazuju brojni primjeri spasavanja života brzim zaustavljanjem krvarenja ili uspješnom primjenom umjetnog disanja. Ljudi, koji pružaju prvu pomoć u Rudnicima zlata, razvili su se u individue s naročitim kvalitetama. Oni su hrabri i odlučni, i pružit će prvu pomoć i pod takvim prilikama, koje često dovode u opasnost i njihove živote. Naši davaoci prve pomoći, isto tako Evropejci kao i urođenici, izvršavaju svakog dana hrabra djela. Ta se djela vrše kao normalni dio njihova dnevnog rada — bez uzbuđivanja i bez pomisli na sebe.

Godine 1910. smrtnost zbog nesreća u Rudnicima zlata bila je 4,21 na tisuću. Smrtnost 1949. g. bila je prema podacima Vladinog odjela za rudarstvo 1,53 na tisuću. Taj vrlo značajni pad u smrtnosti u velikoj se mjeri može pripisati boljim prilikama u rudnicima i boljim sigurnosnim mjerama uvedenim nastojanjima Komiteta za sprečavanje nesreća Transvaalske rudarske komore, ali nema sumnje, da je poboljšanje u organizaciji i efikasnosti prve pomoći također spasilo mnogo života.

Izobrazba u prvoj pomoći

Ako se uzme u obzir, da su u toku 1950. g. 3.522 Evropejca i 37.791 urođenik (crnac) prošli kroz tečaj i ispit za prvu pomoć u rudnicima, onda je jasno, da rad s tako velikim brojem potencijalnih davalaca prve pomoći traži znatan broj predavača, demonstratora i t. d. Veći dio praktične pouke vrše rudarski bolničari. Pri poučavanju urođenika, kojih je broj 10 puta veći od broja Evropejaca, bolničarima pomažu namještenici-urođenici i predradnici-urođenici (boss-boys), koji imaju svjedodžbu prve pomoći Južnoafričkog društva Crvenog križa.

Održavaju se tri tečaja prve pomoći:

- 1) opći tečaj,
- 2) elementarna praktična prva pomoć za rudare i
- 3) prva pomoć za rudare-urođenike.

Opći tečaj

Osnova za taj tečaj je knjiga dra. L. G. Irvina »Prva pomoć i spasavanje u rudarstvu«. Prema naredbi vlade taj tečaj je obavezan za sve namještenike, koji rade pod zemljom, i za neke namještenike, koji rade nad zemljom. Program se sastoji od 8 predavanja i demonstracija. Razredi se sastoje od 25 đaka, a njihov broj nikada ne prelazi 30. Đaci slušaju predavanja i prisustvuju demonstracijama iz elementarne anatomije i fiziologije, iz prve pomoći kod krvarenja, prve pomoći kod šoka, o ranama, infekcijama, frakturama, o uzrocima i prvoj pomoći kod konkusija i kompresija, o toplinskom udaru i toplinskom kolapsu. Poučavaju se, kako se vrši umjetno disanje (Schaeferova, Howardova i Silvesterova metoda) i što se radi kod električnih nezgoda, ope-

klina, ozljeda oka i otrovanja. Posljednje predavanje obrađuje napose rudarske nesreće. Ističe se važnost povijanja i prve pomoći kod malih rana. Obrađuju se nesreće, koje mogu da nastanu kod miniranja ili kod rušenja pećina. Otrovanje dimovima eksploziva i prva pomoć opisuju se također. Djelovanje ugljičnog monoksida, ugljičnog dioksida i nitroznih plinova također se spominje. Predavanja, koja traju otprilike jedan sat, održavaju liječnici, obično liječnici rudnika. Iza predavanja dolazi praktična demonstracija prve pomoći u vezi s predmetom predavanja. Tu demonstraciju vodi rudarski bolničar. To također traje oko jedan sat.

Nakon svršetka tečaja kandidati polažu praktički i usmeni ispit kod liječnika: za uspješno položeni ispit traži se 50% bodova. Kandidat, koji je s uspjehom svršio tečaj, dobiva od Južnoafričkog društva Crvenog križa svjedodžbu o sposobnosti za pružanje prve pomoći. Ta svjedodžba vrijedi 3 godine. Kandidat, koji je prošao kroz opći tečaj, može nakon određenog vremena pristupiti višem ispitu prve pomoći. Na tom ispitu on dobiva srebrnu ili zlatnu medalju, već prema uspjehu, koji je pokazao. Tu se traži detaljnije znanje o prvoj pomoći i spasavanju, a naročita se važnost polaže na sposobnost za predavanje tog znanja drugima. Demonstratori i bolničari obično posjeduju srebrnu ili zlatnu medalju. Kao općeniti poticaj za vršenje prve pomoći uprava rudnika plaća 30 šilinga svakom kandidatu, koji je s uspjehom svršio tečaj.

Elementarna praktična prva pomoć za rudare

Da bi se potaklo i druge rudare, a ne samo namještenike, da se bave prvom pomoći, Rudarska komora u suradnji s Južnoafričkim društvom Crvenog križa uvela je u julu 1936. elementarni tečaj za praktičnu prvu pomoć za rudare. Pouka u tom tečaju potpuno je praktična i osniva se na knjizi »Elementarna praktična prva pomoć za rudare«, koju je objavio Komitet za sprečavanje nezgoda, a odobrilo Južnoafričko društvo Crvenog križa. Taj je tečaj namijenjen onima, kojima bi moguće bilo teško da slijede predavanja propisana za napredniji opći tečaj, ali koji su ipak željni da nauče prvu pomoć. Rudarski naučnici i daci državnih rudarskih škola također prisustvuju tim tečajevima, koji su za njih obavezni.

Program se sastoji od 8 demonstracija iz elementarne prve pomoći. Izobrazba je koncentrirana na jednostavnim osnovama prve pomoći; to su 1) zaustavljanje krvarenja, 2) kako se vrši umjetno disanje, 3) prva pomoć kod šoka, 4) povijanje rana i 5) prva pomoć kod preloma.

Demonstracije vrše demonstratori-laici, obično rudarski bolničari, a kandidate ispituje liječnik. Južnoafričko društvo Crvenog križa izdaje svjedodžbe o sposobnosti za vršenje praktične prve pomoći, a uprava rudnika isplaćuje 30 šilinga rudarima u svrhu poticaja. Svjedodžbe vrijede tri godine.

Prva pomoć za rudare-urođenike

To je tečaj elementarne praktične prve pomoći u svojem najjednostavnijem obliku namijenjen radnicima-urođenicima, koji sačinjavaju najveći dio davalaca prve pomoći u rudnicima. Pouka se osniva na knjizi pokojnog dra. H. T. H. Butta »Ilustrirana prva pomoć« (Ikusiza Aba Limele), koju je objavio Komitet za sprečavanje nezgoda, a odobrilo Južnoafričko društvo Crvenog križa. Ta je knjiga slična »Elementarnoj praktičnoj pomoći za rudare« i potpuno je praktična, te se većinom sastoji od fotografija radnika-urođenika, koji vrše različite postupke prve pomoći. Velika većina crnačkih rudarskih radnika nepismena je, tako da je tekst reduciran na minimum; ono malo teksta napisano je u tri jezika, te opisuje samo slike, koje ilustriraju različite postupke prve pomoći. Kao i kod elementarnog tečaja za rudare, pouka je koncentrirana na praktičnu primjenu prve pomoći. Naročito se ističe važnost povijanja i pružanja prve pomoći kod malih rana, da bi se opasnost od sekundarne infekcije svela na minimum.

Posljednje predavanje sastoji se u razgovoru o zdravlju i sigurnosti. Urođenik sa sela, koji dolazi u rudnik, zna vrlo malo o elementarnoj higijeni i sanitaciji, o širenju bolesti i t. d. To predavanje se daje u nadi, da će radnik

za svog boravka u rudnicima, a to je obično tri, devet ili dvanaest mjeseci, usvojiti neke od principa higijene i da će, kad se vrati kući, raširiti to znanje, koje je stekao u rudniku, na dobro svoje porodice i svog naroda.

Citav se tečaj sastoji od 10 predavanja i praktičnih demonstracija, koje se protežu 4 do 6 sedmica. Pouku daju rudarski bolničari ili demonstratori uz pomoć urođenika, koji su svršili tečaj prve pomoći. Urođenici su brzi i oduševljeni daci, te je pravo čudo, kako brzo uče. Na kraju tečaja ispituje kandidate rudarski liječnik. Kandidati, koji polože ispit s uspjehom, dobivaju svjedodžbu Južnoafričkog društva Crvenog križa o sposobnosti za pružanje praktične prve pomoći, a uz to dobivaju i značku s emblemom društva. Tu značku oni nose pri radu, i po njoj se kvalificirani davalac prve pomoći poznaje. Svjedodžba vrijedi tri godine, a vlasnik svjedodžbe dobiva 5 šilinga na mjesec za vrijeme zaposlenja.

Politika industrije zlata jest, da svi »boss boys«, t. j. urođenici, koji predvode grupu od 10 do 15 radnika, svi vozari lokomotiva i drugi urođenici, koji rade neke stručnije poslove, dobiju valjanu svjedodžbu prve pomoći. Nastoji se, da ne manje od 10% podzemnih radnika-urođenika bude izvježbano u prvoj pomoći.

Budući da namještenici-urođenici sačinjavaju veliku većinu radnika u rudnicima, i budući da su oni više izvrgnuti ozljedama nego Evropejci, koji većinom vrše nadgledničke poslove, jasno je, da se većina nesreća događa među urođenicima, a isto tako da najveći dio prve pomoći pružaju urođenici. Nema sumnje, da su oni dobri davaoci prve pomoći. Način, na koji urođenici postupaju kod nesreća i ozljeda, stvarno je priznanje metode razvijanja prve pomoći u Rudnicima zlata. Urođenici tretiraju svoje pacijente s velikom vještinom i razumijevanjem. Oni cijene činjenicu, da je upravo isto tako važno poviti male rane, kao što je važno poviti velike rane; oni su na taj način mnogo pridonijeli smanjivanju broja sekundarnih infekcija u toku posljednjih 20—30 godina. Bez pretjeravanja može se reći, da je urođenički davalac prve pomoći isto tako sposoban da tretira veću ozljedu kao i svaki izvježbani Evropejac — davalac prve pomoći.

Važnost prve pomoći u suzbijanju sepse

Najvažniji rezultat razvitka prve pomoći u rudarskoj industriji jest nazadovanje broja sekundarnih infekcija. Podzemni uvjeti vlage i temperature i odsutnost sunčanog svijetla idealne su prilike za rast mikroorganizama. Prema tome treba očekivati, da će se i najneznatnije rane inficirati, ako se ne pruži hitna prva pomoć.

Otprilike prije 30 godina, kad razvitak i organizacija prve pomoći još nisu bili dostigli današnji visoki stepen, sepsa je dolazila kao posljedica gotovo svake ozljede pod zemljom, a rudničke bolnice bile su pune takvih oboljenja. Gasne gangrene i amputacije zbog sepse bile su česte, a smrt zbog otrovanja krvi bila je i suviše obična stvar. Poboljšanje se dakako ne može pripisati potpuno prvoj pomoći, ali činjenica, da je nazadovanje sepse započelo mnogo prije, nego što su se pojavili antibiotici, dokaz je, da je prva pomoć bila jedan od primarnih faktora, koji su doveli do nazadovanja sepse.

Organizacija prve pomoći u jednom rudniku

Ustrojstvo prve pomoći u jednom rudniku s otprilike 1.300 bijelaca i 10.500 urođenika može se uzeti kao tipičan primjer organizacije prve pomoći pro-sječnog rudnika zlata na Witwatersrandu. Bolničar je direktno odgovoran za prvu pomoć. On je u prvom redu odgovoran za opću organizaciju prve pomoći direktoru, a u drugom redu on je pod tehničkom kontrolom liječnika, preko kojega se naručuje sva oprema. Bolničar može imati jednog ili više pomoćnika. To zavisi od veličine rudnika.

Da bi se prva pomoć mogla pružiti u svim nesretnim slučajevima, imenovani su neki evropski službenici i urođenici za davaoce prve pomoći. Oni su raspodijeljeni kroz čitav rudnik, da bi se na taj način osigurala jedno-

likost raspodjele osoblja za pružanje prve pomoći. U svakoj »glavnoj postaji« nalazi se stanica za prvu pomoć. Rudnik, koji ovdje opisujemo, ima 43 glavne postaje i prema tome 43 stanice za prvu pomoć. Za stanicu za prvu pomoć odgovoran je jedan podzemni službenik, koji mora posjedovati valjanu svjedodžbu prve pomoći. Svaka stanica za prvu pomoć opremljena je sa dva službeno propisana »ormarića za prvu pomoć«, 4 gunja i dvije nosiljke. U nekim rudnicima određene Glavne stanice za prvu pomoć raspoložu s ampulama trikloretilena i inhalatorima. Pokazalo se, da je taj analgetik od neprocjenjive vrijednosti i u slučajevima teških ozljeda, i da pacijentu pruža veliko olakšanje od boli za vrijeme transporta u bolnicu. Pacijent sam sebi daje to sredstvo za smanjivanje boli uz kontrolu bolničara. Boce s kisikom i ugljičnim dioksidom zajedno s maskama također se drže u tim stanicama, a isto tako i u ambulantomama u blizini glavnih okana.

Svaki podzemni službenik nosi na svom pojasu malu kutiju od kože ili metala, koja sadržava jedan srednji i jedan mali sterilni zavoj u nepromočivoj vrećici, i bocu od jedne unce, koja sadržava 1% merkurokrom ili koji drugi vodeni antiseptik. Upotreba jodne tinkture napuštena je, jer je često uzrokovala nadraživanje.

U svakoj stanici za prvu pomoć na dužnosti je jedan kvalificirani urođenik, davalac prve pomoći. On se brine za unesrećene, koji su doneseni u stanicu, i bavi se samo prvom pomoći i brigom za stanicu. Svi urođenički »boss-boys« (predradnici) nose sa sobom na opasac pričvršćenu metalnu kutiju s istim sadržajem, koji imaju i kutije evropejskih službenika. Oni su kvalificirani davaoci prve pomoći i sačinjavaju otprilike 10—15% urođeničkih podzemnih radnika. Osim glavnih stanica za prvu pomoć kroz čitav rudnik raspodijeljeni su »pункtovi« za davanje prve pomoći (intermediate first aid points). Na tim »pункtovima« nalaze se ormarići za prvu pomoć, koji sadržavaju antiseptična sredstva i zavoje. Predradnik, koji vodi radnu grupu, donese taj ormarić na radno mjesto na početku »šihthe«. On se brine za manje ozljede u svojoj radnoj grupi. Na kraju radnog vremena on ponese taj ormarić na površinu, gdje ga ponovo napuni u ambulanti glavnog okna.

Svaki zamotak za prvu pomoć sadržava listić papira, na koji se unose podaci o nesreći, kod koje je pružena prva pomoć. Da bi se vodila evidencija o nesretnim slučajevima i da bi se spriječila zloupotreba potrepnosti za davanje prve pomoći, treba te listiće predati bolničaru ili njegovu zamjeniku na glavnom oknu, prije nego se dobije novi zamotak.

U slučaju veće nesreće donosi se potrebna oprema iz glavne stanice za prvu pomoć na mjesto nesreće, te se prva pomoć daje tamo, ako je to moguće. Nakon toga unesrećeni se prenese na Glavnu stanicu i pošalje direktno na površinu, a odatle ambulantom kolima u bolnicu.

Bolničar često silazi pod zemlju, da bi se lično pobrinuo za ozbiljnije slučajeve.

Urođenici s manjim ozljedama dobivaju dalju njegu u stanicama za previjanje. Ta se previjališta nalaze na ulazu u naselja, gdje stanuju urođenički radnici. Svaki urođenik s manjom ozljedom, bila to svježja ili stara ozljeda, treba da prođe kroz previjalište. Nove ozljede se ponovo previju, a stare podvrgnu pregledu, i, ako je to potrebno, također ponovo previju. Za evidenciranje svakog pojedinog slučaja služi posebna kartoteka. Evropejci s manjim ozljedama previjaju se u ambulanti u blizini glavnog okna.

Prva pomoć na površini

Premda je organizacija prve pomoći predviđena uglavnom za podzemni rad, gdje se događa najveći broj nesretnih slučajeva, vodi se briga i o nesretnim slučajevima, koji se dogode na površini.

U rudniku, koji ovdje opisujemo, zaposleno je na površini 1.800 urođenika i 529 Evropejaca. Ti radnici rade u montažnim radionicama, kotlarskim radionicama, radionicama za popravljanje bušilica, stolarskim radionicama i t. d. i u postrojenjima za ekstrakciju zlata. Na mjestima, kao što je kotlarnica ili

montažna radionica, gdje je vjerojatno, da će se dogoditi veći broj nesreća, nalaze se službeno propisani ormarići za prvu pomoć. Sve druge radionice snabdjevene su kutijama, koje sadržavaju sterilne zavoje u celofanu, elasto-plast, antiseptična sredstva, sal volatile, vatu, jedan tourniquet (instrument za stezanje žila).

Svi predradnici-šefovi radionica moraju posjedovati valjanu svjedodžbu prve pomoći.

Kod svakog glavnog okna nalazi se ambulanta, u kojoj se nalazi krevet za unesrećenike, koji čekaju transport, dvoja nosila i obični pribor za prvu pomoć. Premda se ta ambulanta upotrebljava uglavnom za unesrećenike s podzemnih radnih mjesta, ozljede, koje se dogode kod površinskog rada u blizini okna, također se tretiraju u ambulanti. Kad nije na dužnosti pod zemljom, bolničar se nalazi u ambulanti. Na stalnoj dužnosti u tim prostorijama nalaze se kvalificirani urođenici-davaoci prve pomoći.

U pogonu za redukciju, gdje se za ekstrakciju zraka upotrebljava cijanid, namještenici moraju biti upućeni u prvu pomoć kod otrovanja cijanidom. U predavanjima o prvoj pomoći njih se poučava, kako se upotrebljava cijev za ispiranje želuca i šta se radi u slučaju otrovanja cijanidom. Ormarić, koji sadržava opremu za prvu pomoć kod otrovanja cijanidom zajedno s točnim uputama, smješten je u svakom pogonu za redukciju.

Natjecanja ekipa za prvu pomoć

Osim izobrazbe pojedinaca u prvoj pomoći Komitet za sprečavanje nesreća Komorc za rudarstvo potiče izobrazbu ekipa, evropejskih i urođeničkih, za spasavanje i prvu pomoć. Tako izobražene ekipe sudjeluju u natjecanjima, koja se održavaju svake godine. Pokazalo se, da ta natjecanja razvijaju interes za prvu pomoć među radnicima i prijateljski duh takmičenja. Velik interes za ta takmičenja pokazuje rudarska zajednica i opća publika. Takmičenja se obično održavaju u nedjelju, a prisustvuje im na stotine radoznalih gledalaca, Evropejaca i urođenika.

Ekipe se sastoje od pet članova, a svaki član treba da posjeduje valjanu svjedodžbu prve pomoći.

Jedan član ekipe igra ulogu bolesnika. Zadatke propisuje Južnoafričko društvo Crvenog križa, a kod rada se upotrebljava samo standardna oprema za prvu pomoć. Ekipe treba da izvrše tri odvojena zadatka. U prvom zadatku svaki član ekipe dobije praktični zadatak u prvoj pomoći, koji treba da izvrši u 10 minuta. U drugom i trećem zadatku svaka ekipa dobije zadatak, koji treba da izvrši kao cjelina. I ti zadaci treba da se izvrše u 10 minuta.

Godine 1950. sudjelovale su kod natjecanja 424 evropejske i 2.123 urođeničke ekipe, t. j. 2.120 Evropejaca i 10.615 urođenika.

Spasavanje u rudniku

Prva pomoć i spasavanje odvijaju se paralelno, pa treba nešto reći i o toj vrlo važnoj grani organizacije prve pomoći.

Bitni uvjet za uspješan rad na spasavanju je izobrazba i organizacija. Zbog vrlo napornih i teških prilika, pod kojima može biti potrebno da rade, ljudi za taj posao posebno se odabiru s obzirom na fizičke sposobnosti i temperament. Njih se podvrgava na početku prilično rigoroznom liječničkom pregledu, i taj se pregled ponavlja u razmacima od 5 mjeseci. Izobrazba se vrši u centralnoj stanici za izobrazbu. Ljudi vježbaju pod prilikama, koje su koliko je god moguće sličnije prilikama, u kojima bi se mogli naći u stvarnom životu. Ljudi treba da vrlo dobro poznaju svoje izolacione aparate, jer će samo na taj način imati potpuno povjerenje u njih. Ekipe za spasavanje u witwatersrandskim rudnicima zlata upotrebljavaju »Proto« izolacione aparate s kisikom. Izobraženi se ljudi raspodjeljuju po lokalnim stanicama za prvu pomoć i grupiraju u ekipe od pet ljudi, a šesti čovjek je rezerva. Članovi jedne ekipe vježbaju zajedno, a kod spasavalačkih radova sudjeluju kao jedna ekipa.

Osim predavanja i demonstracija o vatrogastvu i spasavalačkim radovima održavaju se i iscrpna predavanja o plinovima, koji dolaze u rudnicima zlata i ugljena.

Službeno propisani ormarić za prvu pomoć je metalna kutija dimenzija 59,1×38,12×13,48 cm i sadržava:

- garnituru šinja za prvu pomoć;
- 2 tourniqueta (specijalni instrument za zaustavljanje krvarenja);
- 18 trokutastih marama;
- 1 tucet velikih i 1 tucet malih zavoja za prvu pomoć;
- $\frac{1}{2}$ kg lanenih kompresa;
- $\frac{1}{4}$ kg vunenih kompresa;
- svitak »prikirinske gaze«;
- 1 tucet zapinjača (siherica);
- 6 bočica od 56 g sa sredstvom za povraćanje;
- 6 bočica od 56 g sa sredstvom za nadraživanje;
- 1 bocu jodne tinkture;
- 1 par škara;
- 1 medicinsku menzuru;
- 4 paketa od 28 g komprimirane gaze.

* Prema starim propisima uključen je i jod, ali se više ne upotrebljava.

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