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A Comparative Study of Miners' Training and Supervisory Certification in the Coal Mines of Great Britain, the Federal Republic of Germany, Poland, Romania, France, Australia and the United States: The Case for Federal Certification of Supervisors and Increased Training of Miners

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A COMPARATIVE STUDY OF MINERS' TRAINING AND SUPERVISORY CERTIFICATION IN THE COAL MINES OF GREAT BRITAIN, THE FEDERAL REPUBLIC OF GERMANY, POLAND, ROMANIA, FRANCE, AUSTRALIA AND THE UNITED STATES: THE CASE FOR FEDERAL CERTIFICATION OF SUPERVISORS AND INCREASED TRAINING OF MINERS

J. DAVITT McATEER*
L. THOMAS GALLOWAY**

The training of coal miners and their supervisors has long been recognized as an essential element for reducing the incidents of injuries and deaths in the mines. This article will address the

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** B.A. 1967, Florida State University; J.D. 1972, University of Virginia Law School.

The material on which this article is based was gathered during visits by the authors to the respective countries in May and June, 1977, May and June, 1978, and November, 1979. Financial assistance was provided by the German Marshall Fund, located in Washington, D.C. The views expressed are the authors' and do not necessarily reflect those of the German Marshall Fund. The authors wish to express their appreciation to Linda Rothnagel and Terri Pencil for their assistance in the preparation of this article.

Ed. note. This article is the first in a forthcoming series of articles that will compare various aspects of American underground mining practices with those of the European countries listed in the title. A parallel international comparison of surface mining practices undertaken by the same authors appears elsewhere in the literature. See Galloway & McAteer, Surface Mining Regulation in the Federal Republic of Germany, Great Britain, Australia, and the United States: A Comparative Study, 4 Harv. Envt'l L. Rev. 261 (1980).

1 The formal education of persons engaged in underground coal mining extends back over two centuries. The first mining school was established at Freiburg, Saxony (a former state of Germany) in 1766 for the purpose of teaching the principles of mining and such allied subjects as metallurgy and mineralogy. A. BRYAN, THE EVOLUTION OF HEALTH AND SAFETY IN MINES 26 (1875).
topic of training and certification of miners and supervisors in American coal mines as compared to the training and certification requirements and programs of the United Kingdom, the Federal Republic of Germany, France, Romania, Poland, and Australia. Following a brief description of each country's coal mining industry, that country's training and certification program will be analyzed and compared with regard to the particular subjects of: (1) new miner training, (2) training of miners for a new skilled job, (3) annual refresher training, and (4) training, qualifications, and certification of supervisors.

**Great Britain**

**COAL INDUSTRY**

Coal mining in the United Kingdom can be traced back to the 13th century. It played a particularly vital role in England's development during the industrial revolution, with the industry reaching its peak annual production level of 287 million tons in 1913.²

Soon after World War II, the industry was taken into public ownership under the Coal Industry Nationalization Act.³ The colliery owners received a total of 338 million pounds for their assets (the coal properties and appurtenant structures), which were then vested in a statutory body, the National Coal Board (NCB).⁴ This organization is responsible for the day-to-day operation and commercial management of the industry.⁵ The Board consists of a chairman and between eight and fourteen members. The Secre-
tary of State for Energy, who appoints the members of the Board, has the power to issue general directions on matters affecting the national interest, to authorize borrowings, and to review the Board’s investment proposals.6

Britain’s coal industry is now the largest in Western Europe and among the world’s most technologically advanced. Virtually all British coal mines employ the progressive and efficient longwall mining system. The industry is a mainstay of the national economy: indigenous coal satisfies roughly thirty-six percent of the primary energy needs and accounts for nearly seventy percent of the fuel used by power generating stations.7 While many seams have been exhausted, reserves of coal in Britain are estimated at 190 billion tons, of which about 45 billion are recoverable using existing mining technology. At present rates of consumption, these reserves would not be depleted for 300 years.8

The 1977-1978 output of nearly 121 million tons was comprised of 104.6 million tons from the NCB’s deep mines, 13.3 million tons from opencast (surface) mines, and 2.8 million tons from privately operated mines and other mines. Approximately 700 major coal faces are being worked at the Board’s 240-odd mines.9

The British coal industry, in addition to its status as a large

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6 "Two wholly-owned companies run non-mining activities: NCB (Ancillaries) Ltd., which is engaged in certain retail fuel distribution operations, computer services and engineering services; and NCB (Coal Products) Ltd., which is responsible for solid smokeless fuel manufacture, and chemical and by-product plants.” Id.

7 NCB is a member of the European Coal and Steel Community (ECSC). The ECSC, established in 1952 under the Treaty of Paris, was formed to ensure an orderly supply of coal and steel to member countries, to promote the rational expansion and modernization of production, and to provide better conditions for employees. There are no duties or quantitative restrictions on coal trade between member states, and discrimination by producers in prices, delivery terms or transport rates is forbidden. The ECSC provides funds for capital investment, research, and other programs, loans to create new jobs in declining coal area, and grants to assist miners made redundant (i.e., who have lost their jobs due to mechanization or other reasons). Id. at 1.

8 Consumption of coal has recently declined because of the British recession and the worldwide recession in the steel industry. Id. at 4.

9 Id. at 2.
scale enterprise, is distinguished with one of the world's best mining safety records. In 1977-1978 the NCB's overall accident rate was 97.9 casualties per 100,000 manshifts. Although there were forty fatal accidents in 1977, this was the lowest overall rate ever recorded.

**HEALTH AND SAFETY LAWS**

Prior to 1974, numerous diffuse ministries were responsible for health and safety of the workers in the various British industries. The Health and Safety at Work Act in 1974 supplanted this segregated regime with one comprehensive and integrated system of law and regulation under the Health and Safety Commission and the Executive. In order to guard the health, safety, and welfare of the workers in almost all of the industries, as well as the health and safety of the public as it is affected by work activities. With respect to the mining industry, the Act provides for a gradual superseding of the Mines and Quarries Acts 1954 to 1971, which had been the specific legislation for that industry.

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10 In 1977-1978, the income of the NCB showed a net surplus of £20.4 million. Gross income was £2,904 million, which included coal sales receipts of £2,334 million and grants under the Coal Industry Acts of £75 million. The government grants went toward the social cost of mine closures, reimbursement of deficient contributions to the mineworkers. The trading profit was £108.7 million after interest payments and other items. Id. at 2.

11 Interview with representatives of Her Majesty's Inspectorate conducted at Regina House, London in May 1978 [hereinafter cited as interview with Her Majesty's Inspectorate]. Notes from the interview are on file with the authors.

12 *British Fact Sheets*, supra note 2, at 4.


14 1974, c. 37.

15 Mines and Quarries Act, 1954, 2 & 3 Eliz. 2, c. 70; Mines and Quarries (Tips) Act, 1969, c. 10; Mines Management Act, 1971, c. 20. The replacement has progressed rather slowly; only a relatively few sets of new regulations have been promulgated. In chronological order, they are: Mines and Quarries Acts, 1954 to 1971 (Repeals and Modifications) Regulations, 1974 STAT. INST. No. 2013; Id., 1975 STAT. INST. No. 1102; Coal Mines (Precautions Against Inflammable Dust) Temporary Provisions Regulations, 1976 STAT. INST. No. 881; Coal Mines (Precautions Against Inflammable Dust) Amendment Regulations, 1977 STAT. INST. No. 913; Coal Mines (Respirable Dust) Regulations, 1978 STAT. INST. No. 807; Mines and Quarries Act 1954 (Modification) Regulations, 1978 STAT. INST. No. 1951; The Mines (Protection Against Inrushes) Regulations, 1979 STAT. INST. No. 318; Coal
Enforcement

Under the Health and Safety Executive, Her Majesty's Inspectorate of Mines and Quarries are responsible for enforcing the mine safety and health laws.16 The Inspectorate is comprised of 101 general inspectors and 30 specialized individuals, who focus on particular problem areas such as ventilation, haulage, etc. A substantial majority of these inspectors are fully qualified mining engineers, and all were colliery managers or undermanagers with a minimum of five years' mining experience.17 The requirement of experience and education level differs substantially from that of the United States, where only a small percentage of the 1,500-odd Federal Mine Safety and Health Administration (MSHA) inspectors are mining engineers.18

Generally, the direct responsibility for safety rests with the manager of the colliery.19 The Inspectorate has the power under the Act to stop production and shut down a section or the entire mine in the event of an imminent danger, but such power is used only rarely.20 In addition, while the Health and Safety at Work Act provides for the prosecution of violators, the Inspectorate has been most reluctant to use this power, preferring instead to use


These regulations have repealed several provisions of the pre-existing Acts, although the original regulations thereunder are to remain in force until specific repeal. 1974 Stat. Inst. No. 2013; A. Glover, supra note 13, at 2. In addition, the new regulations provide that any reference to an inspector in the original regulations is now to be read as a reference to an inspector appointed by the Health and Safety Executive, and that a reference to the Secretary of State is to be construed as a reference to the Health and Safety Executive as well. 1974 Stat. Inst. No. 2013, Reg. 6, 7(1); A. Glover, supra note 13, at 2.

16 Interviews with L. D. Rhydderch, Her Majesty's Chief Inspector, Health and Safety Executive, conducted at Regina House, London in May 1977 and 1978. Notes from the interviews are on file with the authors.

17 Id.

18 Telephone interview with MSHA officials (May 13, 1980).

19 Interviews with Her Majesty's Inspectorate, supra note 11 (May 1977 and 1978). This differs from the American system, where direct responsibility is placed upon the section foreman by most state laws. See notes 276-291 infra and accompanying text.

its informal authority to remove or reprimand errant managers.\textsuperscript{21} Individual inspectors in the United Kingdom have the power to grant exemptions to regulations or directives at individual mines without any other governmental approval. The Inspectorate has the authority to approve training schemes put forward by the individual colliery, and it also conducts accident and disaster investigations.\textsuperscript{22}

**TRAINING AND EDUCATION**

*The Evolution of Training Requirements*

In 1839 an explosion at the Saint Hilda Colliery, County Durham, killed fifty-two miners. As a result of this explosion, a voluntary body composed entirely of nonmining men was formed, and reported:

> The pitman descends 200, 300, and in some instances more than 500 yards into the bowels of the earth, and there traverses subterranean passages, frequently from two to three miles in extent, to his work; where, by the glimmering of a small candle, or more imperfect lamp in a space seldom six feet high, and oftener three or four, he labours in a stooping posture, sometimes lying on his side for eight or ten hours together in an impure atmosphere to extract the mineral that above-ground is diffusing light, heat, riches, and enjoyment.

> In such a situation, often without a moment's warning, he is overtaken by destruction. The gases generated in such abundance in the mine, from some accident suddenly explode and fill the pit with death. In an instant, and in the most fearful manner, he is scorched and shrivelled to a blackened mass, or is literally shattered to pieces against the ragged sides of the mine; or, if out of the immediate range of this terrible piece of ordinance, in a few seconds the afterdamp spreads itself in every direction, and poisons beyond recovery all that it may reach. Humanity has too frequently to deplore these fearful accidents. Within the last 20 years the coal district of the Tyne and Wear alone has had upwards of 680 miners so destroyed.

> It is time that some comprehensive plan for their better security be adopted. The country cannot intend to abandon this

\textsuperscript{21} Id.

\textsuperscript{22} Id.
useful class of men forever to such a fate.\textsuperscript{23}

The Committee recognized the need for scientific education of officers of miners and recommended "the extension of systematic education of mine managers (somewhat on the lines of the staff college for officers in the fighting services)."\textsuperscript{24} Partially in response to this recommendation, the 1877 Parliament required certain levels of practical mining experience in order to qualify for manager or undermanager positions in the mines.\textsuperscript{25}

In 1903, Parliament "recognized for the first time the importance of systematic academic and technical education and training for managers and undermanagers which, if obtained at a recognized institution, was accepted as an alternative to two of the five years practical experience required for these officials by the Act of 1877."\textsuperscript{26}

The next major breakthrough in training came at the close of World War II. Through a procedure entitled General Regulations, the Ministry of Fuel and Power adopted the recommendations previously made by the Royal Commission on Safety in Coal Mines in 1938. That Commission had noted that after a lapse of twenty-seven years the Act of Parliament governing mining safety required revision,\textsuperscript{26.1} but as Parliament had failed to do so, the Ministry responded with the Coal Miners (Training) General Regulations of 1945, superseding the training procedures of the Coal Mining (Training and Medical Examination) Order of 1944 and 1945.\textsuperscript{27}

According to Sir Andrew Bryan, who for several years was Her Majesty's Chief Inspector of Mines and Quarries, these regulations "established the highly important principle that no person shall be employed in or about a coal mine or work on which he has had no previous experience without being adequately trained

\textsuperscript{23} A. BRYAN, THE EVOLUTION OF HEALTH AND SAFETY IN MINES at 25 (1875).
\textsuperscript{24} Id. at 26.
\textsuperscript{25} Id. at 69.
\textsuperscript{26} Id.
\textsuperscript{26.1} Id. at 82.
\textsuperscript{27} In addition to adopting the Royal Commission recommendations, the regulations gave effect to the training recommendations of the Forrester Committee, which had reported in 1942 on the "Recruitment of Juvenile in the Coal Mining Industry." Id. at 83.
for it." These same regulations currently form the basis of the most comprehensive training program for miners in the world. The Health and Safety at Work Act incorporated these original 1945 regulations and subsequent amendments, which thus now have become part of the operative statutory scheme.

In addition, the NCB from time to time establishes directives which are then put into effect in all of the country's mines. The directives regarding training are subject to the advise and the consent of the National Union of Mineworkers and Her Majesty's Mine Inspectorate.

The NCB each year spends approximately £25 million on training out of an overall budget of £625 million. This amount is necessary according to the NCB safety director because "one buys safety; it does not fall into your lap for free."

The NCB employs 1,200 full-time training staff members to work with the 250,000 British coal miners at forty training centers throughout the country. Each mine is assigned at least one full-time training officer, who is responsible for the miner training program. Training for managerial personnel is conducted at two staff colleges operated by the NCB: Graham House at Newcastle on Tyne, which trains middle managers such as deputies; and

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28 A. BRYAN, THE EVOLUTION OF HEALTH AND SAFETY IN MINES 83 (1875).
29 Supra note 15.
30 The NCB currently administers an extensive program of education and training. Although the program is mandated in part by the legal requirements, according to one authority only about 15% of the total effort is required by statute; the remainder is done voluntarily by the NCB. M. Riddle, Training for Health and Safety, at 6.1 (October 29, 1976) (paper presented at Symposium on Health, Safety and Progress, at Harrogate, sponsored by The Institution of Mining Engineers, reprinted in Proceedings of same (1977)) [hereinafter cited as M. Riddle].
31 Id.
32 Id. at 6.2.
33 Interview with J. L. Collinson, Chief Safety Engineer, NCB, in May 1977 [hereinafter cited as interview with J. L. Collinson]. Notes from the interview are on file with the authors.
35 This institution, which employs 15 instructors, operates on an annual budget of over $870,000. Id.
the Vache, which trains the highest level personnel, such as colliery managers and undermanagers. 38

The training program is divided into several schemes tailored to fit the particular needs of the men 37 as they move through the various phases of their careers. Just as in the United States, British miners enter the industry in a variety of ways: some just after completing primary school, 38 some before completing secondary school, 39 and others as adults who enter the industry after having worked elsewhere. Therefore, the training programs must be adaptable in order to meet the needs of a variety of entrants.

New Entrants 40

The NCB training scheme for new entrants, which lasts for three years in its entirety, first entails a minimum indoctrination period of 100 days before the uninitiated recruit begins work underground. 41 This initial basic training is divided into four categories: induction, preliminary basic, underground training faces, and close personnel supervision on a production face. 42

During this initial 100 days the new entrants are placed into one of two training schemes. The first and most common is the Mining Trainees (MT) scheme. This scheme requires no prior academic education, but instead is practically oriented and is

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36 M. Riddle, supra note 30, at 6.6.
37 In every country reviewed except the United States, only males are allowed to work underground as miners, although females are employed on the surface in several countries, including Poland and Romania. Interviews with officials of the respective countries in May 1977, May 1978, and June 1979. Notes from the interviews are on file with the authors.
38 Youths in the United Kingdom as well as throughout Europe, upon graduation from primary school or upon leaving secondary school (before graduation), may secure employment with the NCB. No person is allowed to work underground until he attains the age of 18 years. Before attaining that age the youths are put into the training program and/or given jobs on the surface.
39 In England, primary school lasts approximately 7 years, beginning at age 4-5 and lasting until age 11-12. Secondary school is 5 years in duration for students from ages 12 through 17. Following secondary school, students enter colleges or universities. Telephone interview, British Embassy (May 1980).
40 Throughout this article, “new entrant” will be used to describe employees who are entering the mining industry for the first time, as distinguished from mere new employees who might have worked previously in other mines.
41 M. Riddle, supra note 30, at 6.2.
42 Id.
designed for the miner who wishes to become a miner or "mature mineworker." MT trainees include youths below the age of eighteen years and mature entrants eighteen years and older who want to become mature mineworkers. The basic training consists of: ten days induction, twenty days close personal supervision, eighty days work on the surface near machines, and additional continuous observation of an experienced worker. In addition, after the MT has been assigned a job underground he is given 150 days special training in selected skills.

The second scheme, that of Mining Craft Apprentice (MCA), begins with a practical program similar to that of the MT, but incorporates opportunities for further education and is specially designed for the young trainee who aspires to become a supervisor. The MCA trainee receives 60 days of basic engineering training in addition to the 100-day minimum basic training. Both the MT and MCA training programs extend over the first three years of the new entrant's work.

The second year of working experience for the MCA trainee includes job rotation, coalface instrumentation, and conferences. During the three years, all trainees (MT and MCA) receive 10 days of pre-coalface training, 100 days of basic coalface training, and 40 days (minimum) of improvership training.

At the end of the three years, the MT and MCA schemes diverge. The MT at that time selects his employment, while the

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43 A miner is not considered a mature mineworker until he has completed three years of training and work experience; during the three years he is still considered a trainee. Interview with J. L. Collinson, supra note 33, and additional interview with him in May 1978 in Doncaster, England. Notes from the interviews are on file with the authors.

44 M. Riddle, supra note 30, at 6.2.

45 Id.

46 Id. at 6.3.

47 Id.

48 Id. at 6.2. Before any miner can work within 30 feet of the coalface, he must have undergone a minimum of 120 days training.

49 If during the course of the initial 100-day training program the MT trainee expresses an interest in a supervisory position, he is then placed in the MCA scheme mentioned above, and after the 160 initial training days, during the second year, he is given one year of job rotation. Interview with F. O. Gilder, Head of Mining Training, NCB, at Hobart House, London in May 1978. Notes from the interview are on file with the authors.
MCA rotates for six months on a variety of jobs (for a minimum of two and one half years) working as an apprentice, and thereafter three years on a selected job. Afterwards, upon reaching the age of twenty-five years and successfully completing the required test, the MCA trainee can receive a certification of competency and thus qualify as a trainee for the position of a deputy.50

One important, additional aspect of the training scheme is that a trainee must always be within sight, hearing, and touching distance of the training supervisor or his supervisory workman in a one-supervisor workman to one-trainee ratio.51

Supervisory Training for Deputies52

There are two schemes by which a miner can become a deputy: the traditional scheme, and the new training scheme, which was instituted within the last five years. The traditional scheme includes the following periods of training:

- Practical training - 25 days minimum
- Technical education - 280 hours minimum
- Shotfiring training - 54 hours minimum
- First aid training - 20 hours
- Management training - 60 hours
- Machine training - 5 days53

Under the more recently adopted scheme, the MCA trainee, having completed his apprenticeship (a three-year period), is required to undertake a bridge training program. Usually lasting four years, deputy bridge training seeks to improve technical

50 M. Riddle, supra note 30, at 6.3.
51 Interview with F. O. Gilder, supra note 49.
52 The British supervisory scheme is roughly analogous to the system followed in the United States according to the following table, although the number of employees for which supervisors are responsible, and the level of responsibility, may vary.

<table>
<thead>
<tr>
<th>English</th>
<th>American</th>
</tr>
</thead>
<tbody>
<tr>
<td>deputy</td>
<td>= section foreman, or &quot;section boss&quot;</td>
</tr>
<tr>
<td>overman</td>
<td>= shift foreman</td>
</tr>
<tr>
<td>undermanager</td>
<td>= mine foreman</td>
</tr>
<tr>
<td>colliery manager</td>
<td>= superintendent</td>
</tr>
</tbody>
</table>

Interviews with NCB officials in London and Doncaster, May 1977 and May 1978. Notes from interviews are on file with the authors.

53 M. Riddle, supra note 30, at 6.2.
skills, knowledge, and managerial abilities both with regard to men and machines. The program includes on-the-job training, residential management instruction, and formal education at Graham House, the staff college for individual supervisors. During the entire deputy training program each trainee is assigned to a "linkman" (Counselor), normally the trainee’s immediate supervisor, who acts as a guide and resource person. The program culminates with a comprehensive test, the successful completion of which earns the potential deputy a certificate of competency. This new scheme, which takes six years to complete, has not been in effect a sufficient length of time to allow for a meaningful evaluation.

Overman and Shift Charge Engineers

If the deputy wishes to be promoted to the next supervisory level of overman, he must undergo additional training and certification consisting of six weeks technical management training and two weeks general management training (residential again at Graham House), followed by a practical problem exercise. In order for a miner to become certified as an overman, he must have either a Mining Craft Certificate or its equivalent (for example, an All Mines Deputy Certificate) by having successfully completed 280 hours of technical education. The Shift Charge Engineer must have a Class I Certification.

Engineering Craft Apprenticeship

This apprenticeship, a four-year scheme, begins with the basic training mentioned above (twenty-four weeks minimum) followed by several stints of on-the-job training in addition to specific courses each of four weeks duration. At the end of each training year the engineer apprentice undergoes both practical and written tests. All engineer apprentices attend technical col-

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54 Id. at 6.4.
55 Interviews with F. Warner, Principal, Graham House, Staff Training College, NCB, in Newcastle on Tyne, May 1978. Notes from the interview are on file with the authors.
56 M. Riddle, supra note 30, at 6.3.
57 Id.
58 Id.
59 Id.
A COMPARATIVE STUDY

lege, although not all undertake academic programs.  

**Undermanagers, Deputy Engineers, and Colliery Specialists**

Managers

The Technical Management Education Scheme prepares its graduates for the highest levels of mine management. It is specifically tailored to each individual trainee. Normally a miner would first complete Engineer Training and the Craft Apprenticeship Scheme before beginning this program.

Undermanagers and deputy engineers attend a four-week residential colliery operational management course at the Vache staff training center. A major facet of this training includes solving practical engineering and managerial problems. Colliery managers, engineers, and certain area specialists undergo an additional four-week management course, again at the Vache.

**Refresher Training**

Emphasis on a regular program of retraining is considered by the training officials to be of particular importance, because much of the initial training impact is lost or forgotten over time and because of the need to keep employees abreast of the new and different skills required by advancing mining technology. Craftsmen, officials, and managerial personnel receive this refresher training every two and one half, three, and five years respectively. It is a general course covering amendments to the regulations and new developments in mining practices.

**Specialized Training**

Specialized training, in the form of short courses, is frequently given in order to acquaint safety staff, miners, and craftsmen with any sort of recent developments or changes that

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60 Id. Engineer Craft Apprentices often become supervisory candidates and therefore will need to fulfill certain academic qualifications. Interview with F. O. Gilder, supra note 49.

61 Interviews with F. Warner, supra note 55.

62 Id.

63 Id.

64 Interview with J. L. Collinson, supra note 33.
occur within the industry.65

Re-entrant Training

There are no statutory requirements nor NCB policy rules to govern re-entrant training. However, various NCB divisions require from five to twenty days re-entry induction training, depending upon whether the miner has been away from the industry for more than fifteen months.66

Training Faces and Galleries

The NCB has developed a system of 300 faces and galleries located inside the mines for the sole or primary purpose of training.67 Training galleries are not used for coal production, but are instead used exclusively to instruct new employees in basic skills such as haulage, ventilation, and emergency evacuation, and to familiarize them with underground conditions.

In contrast, training faces are a source of actual coal production, although the production role is subordinate to that of training. At a training face the trainees are under the control and direction of a supervisory trainer and a supervisory workman, but these employees are not required to reach any production goal. Their sole responsibility is the training of mining safety.68

Special Requirements for Trainees

The British training scheme commonly places restrictions upon trainees. For example: a nonface trainee is prohibited from going within thirty feet of the working face, the area of highest danger in a mine; a miner must be eighteen years of age before he can work underground; and the deputy candidate must have attained the age of twenty-five before he qualifies to become a deputy, although this requirement is lowered by two years if the candidate has an acceptable academic training.69

65 M. Riddle, supra note 30, at 6.4.
66 Id. at 6.5.
67 Interview with L. D. Rhydderch, supra note 16.
68 Id.
69 Interview with J. L. Collinson, supra notes 33 and 43.
Program of Training for Mining Craft Apprentices (MCA) and Mining Trainees (MT)\(^7\)

<table>
<thead>
<tr>
<th>MT</th>
<th>MCA</th>
</tr>
</thead>
<tbody>
<tr>
<td>(all periods shown in days, unless specified)</td>
<td></td>
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<tr>
<td><strong>First year</strong></td>
<td></td>
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<tr>
<td>Induction</td>
<td>10</td>
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<tr>
<td>Surface training</td>
<td>20 (minimum)</td>
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<tr>
<td>Preliminary basic course</td>
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<tr>
<td>Mining</td>
<td>30 50</td>
</tr>
<tr>
<td>Engineering</td>
<td>20 20</td>
</tr>
<tr>
<td>Basic engineering training</td>
<td></td>
</tr>
<tr>
<td>Close personal supervision (CPS)</td>
<td></td>
</tr>
<tr>
<td>U/G</td>
<td>20 (minimum)</td>
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<tr>
<td>Job rotation</td>
<td></td>
</tr>
<tr>
<td>Special training in selected skills</td>
<td>150 minimum (leading to substantive employment)</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Second year</strong></td>
<td></td>
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<tr>
<td>Job rotation</td>
<td></td>
</tr>
<tr>
<td>Coalface instruction</td>
<td>— One year</td>
</tr>
<tr>
<td>Conference</td>
<td></td>
</tr>
<tr>
<td>Substantive employment</td>
<td>One year</td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Third year</strong></td>
<td></td>
</tr>
<tr>
<td>Pre-coalface training</td>
<td>10</td>
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<tr>
<td>Basic coalface training</td>
<td>100 (minimum)</td>
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<tr>
<td>Improvership training</td>
<td>40 (minimum)</td>
</tr>
<tr>
<td>Substantive employment</td>
<td>continuous 6 months (following end of 2½ years' apprenticeship)</td>
</tr>
<tr>
<td></td>
<td>3 years</td>
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\(^7\) Taken from M. Riddle, *supra* note 30, at 6.2.
"Taken from M. Riddle, supra note 30, at 6.3."
### GREAT BRITAIN

<table>
<thead>
<tr>
<th></th>
<th>Induction</th>
<th>Surface</th>
<th>Pre-</th>
<th>Logbook</th>
<th>Basic</th>
<th>Class</th>
<th>Personal-Supervision</th>
<th>Total</th>
<th>Induction</th>
<th>Remainder</th>
<th>Second</th>
<th>Maturity</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Entrant</td>
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<td>20</td>
<td>100</td>
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<td>Undercover</td>
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</tbody>
</table>

**Notes:**
- "Junior" for younger workers.
- "Adult" for older workers.
Federal Republic of Germany

Coal Industry

The Federal Republic of Germany is one of Europe’s major coal producers. In 1977, with a work force of 250,000, the country produced 95 million metric tons of bituminous and anthracite coal, roughly one-fifth of the total coal produced from the European continent. While the country is a net coal exporter, domestic coal in addition supplies almost one-third of the country’s energy requirements, largely due to the fact that export quotas and subsidies help to support the production of bituminous coal.

At the end of World War II, the German coal industry was in chaos. The governmental policy was to consolidate the mines, close the less profitable operations, and support the larger, more profitable ones. Both structural and social problems arising from the consequential decreases in the number of employees and in coal production resulted in the formation by law, in 1969, of Ruhrkohle A. G. (RAG).

RAG is responsible for three-fourths of West Germany’s total coal production, and is by far the leading force in West Germany’s coal industry. It was created as a “funeral company,” consolidating thirty companies in varying degrees of economic health in order to close out marginal operations in an orderly fashion. The organization is dominated primarily by steel and electric companies. Although the government owns the mineral rights, private corporations mine the coal as leasees. In December 1969, one year after its legal formation, RAG took control of

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72 Interview with Ministerialrat Hans Berg, Der Minister fur Wirtschaft Mittelstand und Verkehr, Dusseldorf, Federal Republic of Germany, May 1977 and June 1978 [hereinafter cited as interview with Hans Berg]. Notes from the interview are on file with the authors.
72 Id., June 1978.
74 Id.
75 Article 8 of Steveraenderungsgestz 1969 (Tax Amendment Act of 1969), I BGB 1 1211.
76 Interview with Hans Berg, supra note 72.
77 Interview with Kolliga, Director of Division Production, RAG Main Office, in Essen, Germany, on May 31, 1977 [hereinafter cited as interview with Kolliga]. Notes from the interview are on file with the authors.
78 Id.
79 Id.

https://researchrepository.wvu.edu/wvlr/vol82/iss4/39
182,000 employees at fifty-two producing mines.\textsuperscript{80}

In the following years, owing to closure and merger of mines, the number of producing mines decreased from fifty-two to twenty-nine and the number of employees fell from 182,000 to 155,000. During this period, RAG took consolidation measures in all parts of its operations. As a consequence, by 1976 the former 682 faces with an average daily output of 570 tons each were reduced in number to 210 faces each with an average output of 1,234 tons.\textsuperscript{81} Because of the decline in the number of mining jobs and the availability of alternative employment, many German miners permanently left the industry. When mining employment increased again the number of foreign workers grew considerably.\textsuperscript{82}

**HEALTH AND SAFETY LAWS**

German mining safety and health is legislatively governed by a joint system of responsibility shared by the federal government in Bonn and the state governments of Lander. Historically, the state governments, most notably the Land of Northrhein Westfalia, have legislated and enforced mine safety and health matters.\textsuperscript{83} The State Inspectorate are presently the enforcement authority and the various states' acts are the controlling statutes. Presently, in Northrhein Westfalia, legislation is being considered which would revise the major mining legislation. Recently, the federal government has enacted a comprehensive Federal Mining Act, which will regulate all mines by establishing a federal role.\textsuperscript{84}

Under West German federal laws, the minimum requirements for training for all industries are set out. Further, the Vocational Act requires the approval of the instruments by the Federal Ministry of Economics in agreement with the Federal

\textsuperscript{80} Id.

\textsuperscript{81} Id.

\textsuperscript{82} Id.

\textsuperscript{83} Allgemeines Berggesetz vom 24 Juni 1865, in the version of November 7, 1961, Gesetz-und Verordnungsblatt fuer das Land Nordrhein-Westfalen 325, as amended.

\textsuperscript{84} Phone interview with Dr. H. Hine, Commercial Attache, Federal Republic of Germany Embassy, Washington, D.C. on December 15, 1980. Notes are on file with the authors.
Ministry of Education and Science. The responsibility for applying these broad vocational requirements to the mining industry rests with the Labor Union, the Mines Inspectorate, and the mine companies. Plans submitted by the companies and agreed upon by the Union are then reviewed by the Mining Inspectorate. These regulations cover the practical training programs operated by the individual companies as well as the theoretical training conducted in the various institutions.

**TRAINING AND EDUCATION**

Training in the West German mining industry has been conducted for several decades in training centers funded by private industry and the government, and operated under government-Inspectorate authority. There are presently fifty-one training centers supervised by some 2,000 training officials, and approximately 7,000 miners take part in these courses each year.

As required by statute, mining plans which contain training programs are submitted by the mine operators and must be approved by the mine inspectorate of the state. The mine inspectorate reviews all plans submitted by the mine operator annually. The plans must meet the requirements of the state regulations. In addition, the Inspectorate provides technical assistance and oversees all training conducted by approved institutions within the state. The training programs exceed the minimum requirements of the training regulations.

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65 Interview with Hans Berg, *supra* note 72. The Vocational Training Act of August 14, 1969 sets out the skeletal program of instruction and examinations for various occupations including mining.

66 MSHA INFORMATION REPORT, *supra* note 34, at 12.

67 Id.

68 Interviews with Dr. zur Nieden, Director, Division Training Safety and Medical Services, RAG Main Office, Essen, Germany, May 1977. Notes from the interviews are on file with the authors.

69 Id.

70 Interview with Kolligs, *supra* note 77.

71 Interviews with W. German Regulatory Authority, Landesoberbergamt N.W. at Dortmund, West Germany, June 1, 1977 [hereinafter cited as interviews with W. German Regulatory Authority]. Notes from the interviews are on file with the authors.

72 Id.
The Industry Mining Fund (Bergwerksehaftskasse)

By law, all mine operators are required to pay into a fund a royalty based on production. The fund is operated as a non-profit organization with a statutory duty to promote mine health and safety as well as productivity. The fund is used for a number of purposes, including the support of educational institutions to train miners, mine technicians, mining engineers, and supervisors. In addition, the fund supports mining research and provides monies for the improvement of health and safety, the establishment of experimental statutes for mine safety testing, and the maintenance of the West German Mining Museum.93

The fund is directed by a Commission appointed by the State Inspectorate. Its assets are controlled by a Board of company management officials elected for three-year periods by member companies.94 The Board appoints an executive committee to conduct the Fund's business. Illustrative of the Fund's set-up is the Bochum/Westphalian Mining Fund.95

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93 MSHA INFORMATION REPORT, supra note 34, at 10.
94 Id.
95 Id. at 11.
Organization and Services of the Bochum/Westphalian Mining Fund

President [Commissioner]
Board of Management
Executive Committee

Testing and Research

Administrative Offices

Mining Education and Training Mining Schools

Mine Safety and Testing Centers

Research and Development Institutes

Rope, haulage and material testing center
Experimental testing station for explosive technology
Mine safety research center
Mine ventilation center
'Mine archives and museum

Mine machine and mine electricity institute
Chemical institute
Mine survey institute
Institute for geophysics and vibrations and acoustics
Institute for applied geology

Vocational and advanced technical schools
Non-graduate mining school
College for Mining Technology
Advanced mining college for graduate work

*Id.*
The Bochum fund operates training institutions, which are controlled by the regional inspectorate. These institutions provide ninety percent of the training for the mining industry. The fund provides both short-term and long-term courses in addition to seminars for executives and specialists to keep them abreast of the latest technological and managerial developments.

Professional Training

Professional mining training has existed in Germany since the beginning of the 19th century. In the course of the decades, this professional training has been continuously extended and modernized. Today, the training is broken down into four classifications: semi-skilled workers, skilled workers ("Knappe"), technicians ("Steiger"), and engineers.

Mining Schools

Theoretical training is provided at schools which are established and run either by the mining companies themselves or through the mining funds described above. Such schools largely have been recognized as private substitute schools.

The practical part of the training is carried out by the mining companies themselves either in their own training centers, or in those of the firms where apprentices are trained, or in works departments. All works have qualified instructors, who are supervised by a chief instructor.

New Entrants

New entrants to the mining industry generally come from
one of three categories and normally receive training as semi-skilled or skilled miners. The new entrants normally come to the industry as: (1) juvenile employees, or youths below fourteen years of age, who come to the industry after completing primary school;104 or (2) adult entrants, or persons over eighteen years old who are entering the mining industry for the first time, or who are re-entering the industry after an absence of six months; or (3) foreign workers. The mining industry employs roughly 15,000 foreign or guest workers from outside the Federal Republic. The training of these workers includes special provisions for language, etc.105

Semi-skilled Training—Youths

Beginning with youths aged between fourteen and eighteen, an extensive program of classroom and practical training is available. The Vocational Acts sets out general vocational and occupational requirements106 and the coal mine legislation sets out specific training requirements for youths under eighteen years of age. The companies are required by statute to submit separate training plans for young miners.107

Many of the programs extend to three and one half years of training. As required by statute, at least six months of the training must be on specific underground operational procedures before the young miner is permitted to work underground. The six months is divided into two months of preparatory training and four months of job-specific training under close supervision.108

These semi-skilled or “junior” miners receive instruction oriented toward practical skills to assist them in carrying out miners’ work. Normally, the Miners Technical Schools teach these junior miners in accordance with a curriculum approved by the

104 Juvenile employment in the Federal Republic of Germany is similar to that described above for Great Britain. See supra note 38.
105 Interview with Hans Berg, May 1978, supra note 72.
106 Id. The 1976 Vocational Training Act prohibits the employment of youths under 14 years of age. Persons under the age of 16 are not permitted to work underground.
107 Id.
108 Interviews with W. German Regulatory Authority, May 1978, supra note 91.
companies and the Inspectorate. Vocational training for those with special aptitudes continue until they are almost eighteen. At the end of the training program the young miner must complete an examination and, if successful, he receives a certificate which sets forth his occupational abilities and describes his personal qualifications.

These young certified miners subsequently will begin work underground with experienced supervisors. Training facilities exist for the training of young people who will be working underground, however, and the first phase of practical underground training takes place above ground. Training always occurs in special training centers or other specialized units before assignment to on-the-job training under the supervision of experienced men.

Following the twenty days of classroom and mock above-ground training, new miners are assigned to simulated underground mine training areas. The training faces in such areas are usually maintained for training and testing. The miner's instructors from the training center will, in cooperation with the mine superintendent, prescribe a practical training program for the miner after he has completed his classroom training. In 1977, the labor contract provided for a minimum one-month paid training program for all new-entrant miners.

Finally, by tradition, when the new entrant enters the mine as a full-fledged miner, he is given a medallion made of coal to celebrate his first day underground as a miner.

**Foreign Workers and Adult Entrants**

For new entrants aged eighteen or older who have not been

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109 Id.
110 Id.
111 INTERNATIONAL LABOR ORGANIZATION REPORT, supra note 34, at 43.
112 Interviews with J. Nehrdich, supra note 103.
113 Id.
114 Interview with Herr Adolph Schmidt, President and Staff Abteilungsleiter der IG Bergbau und Energie in Bochum, Germany, May 1977 and June 1978. Notes from interview are on file with the authors.
115 Interview with Herr Gunther Regerbogen, Safety Officer at General Blumenthal Mine, in Recklinghausen, June 1978. Notes from the interview are on file with the authors.
previously employed in underground mining, the industry provides a training plan for beginners which is distinct from the new-entrants program for youths. Foreign workers, who normally fall into this category, will be given beginner training in compliance with the Inspectorate's regulations. Because such miner must have an adequate knowledge of German, the Training Department provides twenty days of teaching the German language. Training occurs at the mine training center, and then the miners are initiated into their jobs by experienced persons.

Miners who have past experience but have been away from the industry for six months or more are considered inexperienced adult miners and are given twenty days of training, ten in the classroom and ten on a training face, all under close personal supervision.

Training Topics Covered

The inexperienced miner training as a candidate for semi-skilled positions follows the following guidelines:

1. Practical training
   a. learn the surface layout of mine offices (1st day of employment)
   b. learn the underground layout of mine workings (2nd day of employment)
   c. a minimum of 20 days practical mine training and 10 days classroom training for non-face workers.
   d. 40 days of additional job training under close supervision for miners who will be employed on contract work.
   e. the number of untrained miners in any single training session is not to exceed 8. Individual practical mine training will be given on roof support procedures.
   f. should a miner after completing the training, transfer to another occupation within 6 months, 20 additional training days will be necessary before beginning the new job.

2. Classroom Training
   Inexperienced miners undergo 20 days of classroom training on the following subjects:
   a. regulations on health and safety do’s and dont’s in underground mining operations.

116 Interview with Hans Berg, May 1977, supra note 72.
117 Interviews with Kolligs and Dr. zur Nieden, supra notes 77 and 88.
b. hoisting and haulage procedures.
c. use of personal protective devices.
d. signal procedures for haulage.
e. safety procedures for self-propelled machinery.
f. safety significance of proper roof supports.
g. safety in using explosives.
h. health aspects of respirable dust and control of dust.

The classroom training is given in groups, with no more than 20 inexperienced miners in any one group.  

An additional category of training exists for a miner who changes from his regular job after six months. That miner is required to undergo a minimum of ten days of new assignment training. Responsibility for satisfactory training of inexperienced miners rests with the trainee’s instructors and the supervisors who are responsible for his close personal supervision.

Skilled Workers

A number of recognized occupations require extra training beyond that of semi-skilled workers. Training for these occupations takes from one and one half to three and one half years, depending on the specific job. Skilled worker trainees are considered apprentices. The finishing of primary school, or even the upper levels of secondary school, is normally a prerequisite for acceptance as a skilled worker trainee or apprentice. In some of the recognized occupations where the skill would be applicable to a variety of industries, trainees will often attend a public vocational school.

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118 MSHA INFORMATION REPORT, supra note 34, at 13, 14.
119 Interview with J. Nehrdich, supra note 103.
120 MSHA INFORMATION REPORT, supra note 34, at 14.
121 Interview with Kolligs, supra note 77.
122 INTERNATIONAL LABOR ORGANIZATION REPORT, supra note 98, at 43.
West Virginia Law Review, Vol. 82, Iss. 4 [1980], Art. 39

West German Training Programs for Skilled Workers Along with Length of Training

<table>
<thead>
<tr>
<th>Job</th>
<th>Training Period (in years)</th>
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<tbody>
<tr>
<td>miners for hard coal or ore mining</td>
<td>3</td>
</tr>
<tr>
<td>mines surveyors</td>
<td>3</td>
</tr>
<tr>
<td>dresser in the mining industry</td>
<td>3</td>
</tr>
<tr>
<td>repairman</td>
<td>3</td>
</tr>
<tr>
<td>electrical fitter</td>
<td>2</td>
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<tr>
<td>specialist in the field of electronics for power plants, based on the training as electrical fitter</td>
<td>1 1/2</td>
</tr>
<tr>
<td>specialist in cybernetics</td>
<td>2 1/2</td>
</tr>
<tr>
<td>latheman</td>
<td>3</td>
</tr>
<tr>
<td>chemical skilled worker</td>
<td>3</td>
</tr>
<tr>
<td>chemical laboratory assistant</td>
<td>3 1/2</td>
</tr>
<tr>
<td>clerk in a mining company</td>
<td>3</td>
</tr>
<tr>
<td>office clerk</td>
<td>3</td>
</tr>
<tr>
<td>office worker</td>
<td>2</td>
</tr>
</tbody>
</table>

Skilled Miner ("Knappe")

During the three-year training program a skilled miner ("Knappe") trainee will learn how to perform every kind of underground work. Juveniles who are in the skilled miner program after a period of time, although they specialize in one particular aspect of mining, nonetheless learn the fundamentals of both geology and mineral deposits. All trainees study various types of developmental work and various methods of mining, including the operation and maintenance of mining machines, and recognition and evaluation of dangers. Upon completion of this apprenticeship, the trainee will take the skilled worker's examination ("Knäppenprüfung") before an examining board of the Chamber of Industry and Commerce.

The system is similar for other categories within the skilled

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123 Hans Berg, Professional Training for Federal Republic of Germany Miners (a report) (author is a Mining Engineer, and at Department of Economics and Transport of Nordrhein-Westfalen, Head of the Departmental Section for Safety and Health in Mines and Supervision of the Mining Industry) [hereinafter cited as Hans Berg Professional Training Report]. Report is on file with the authors.

124 Id. at 4.

125 MSHA INFORMATION REPORT, supra note 34, at 12.

worker classification, such as surveyors, dressers, etc. All are trained specifically in the skills they will need to carry out the particular job. Juveniles may also be trained in more general industrial occupations, such as repairman or electrical fitter, for which uniform federal training regulations are applicable and in which there is special training in the problems connected with those occupations in the mines. The same is true of the more commercially oriented occupations, such as clerks.\textsuperscript{127}

A skilled worker may also choose to take further training within the classification of skilled worker.\textsuperscript{128} After several years of work as a skilled worker he may choose to train a variety of jobs, such as shot-firer, fireman, dust particle counter, job analyst, etc.\textsuperscript{129}

Training is conducted at the mine training facility, at the government's State Training Center, and also at the training face. Simulated training faces are used throughout West Germany, both to train skilled miners (apprentices) and to test miners before they are assigned to regular jobs.\textsuperscript{130} Training plans are normally very detailed and are broken down to specific topics, objectives, syllabus, and recommended text books.

\textsuperscript{127} Hans Berg Professional Training Report, \textit{supra} note 123, at 6.
\textsuperscript{128} Id. at 5.
\textsuperscript{129} Id.
\textsuperscript{130} Id. at 4.
### MINE MECHANIC TRAINING PROGRAM SUBMITTED BY RUHR COAL APPROVED BY STATE INSPECTORATE

<table>
<thead>
<tr>
<th>Number</th>
<th>Training subjects</th>
<th>Weeks</th>
<th>Place of training</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fundamentals of workshop practice.</td>
<td>32</td>
<td>Main shop facility.</td>
</tr>
<tr>
<td>2</td>
<td>Lathe and machine operations</td>
<td>7</td>
<td>Central workshop facility.</td>
</tr>
<tr>
<td>3</td>
<td>Cutting and welding</td>
<td>13</td>
<td>Do.</td>
</tr>
<tr>
<td>4</td>
<td>Machine shop work</td>
<td>15</td>
<td>State Technical Training Center.</td>
</tr>
<tr>
<td>5</td>
<td>Electrical installations</td>
<td>10</td>
<td>Do.</td>
</tr>
<tr>
<td>6</td>
<td>Handling of existing operations, pipe and hose lines, pneumatic and hydraulic systems.</td>
<td>12</td>
<td>Do.</td>
</tr>
<tr>
<td>7</td>
<td>Mine safety, and reviewing of mine accident information.</td>
<td>12</td>
<td>Do.</td>
</tr>
<tr>
<td>8</td>
<td>Mine ventilation</td>
<td>3</td>
<td>Technical Training Center of the company (test face).</td>
</tr>
<tr>
<td>9</td>
<td>Mine development and production</td>
<td>18</td>
<td>Technical Training Center of the company (test face).</td>
</tr>
<tr>
<td>10</td>
<td>Fragmentation, loading, and hauling</td>
<td>24</td>
<td>Do.</td>
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<tr>
<td>11</td>
<td>Discussion of roof supports</td>
<td>5</td>
<td>Do.</td>
</tr>
<tr>
<td>12</td>
<td>Transportation and storage</td>
<td>5</td>
<td>Do.</td>
</tr>
<tr>
<td>13</td>
<td>Principles of work safety, accident prevention, and health protection.</td>
<td>All weeks during the training period</td>
<td>Main mine facility.</td>
</tr>
</tbody>
</table>

The skilled miner, after proper qualifications and adequate experience, can apply for further training in order to become eligible for supervisory functions as a "Steiger" in the respective technical field. In addition, skilled workers may attend preschools of mining to prepare for attending Miners Technical Schools. Such school attendance prior to attending technical

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131 MSHA INFORMATION REPORT, supra note 34, at 12. See also RUHR COAL CORP., RUHRKÖHLER A.G. BETRIEBELICHER AUSBILDUNGS PLAN FÜR BERGMECHANIKER (1975) (Training Plan for Mine Mechanics).

132 The German Steiger is roughly the equivalent of the section foreman in the United States, although the term also applies to additional positions. Interview with Hans Berg, supra note 72.
schools, although not compulsory, is recommended.  

Miners Technical School

The miner who completes Knapper training and the skilled mine courses as well as the pre-technical school is qualified as a certified technician ("Steiger"). These candidates must have successfully completed the upper division of elementary school and the training as a skilled worker in the particular field, and must have a minimum of two year's experience at an appropriate occupation to be eligible for the Steiger technical school.

Such education can be either full-time (four semesters equals two years), or part-time (six semesters part-time equals three years). These technical schools are owned by the mining industry and operated through the mining funds. After Steiger training, these miners will be qualified for supervisory and managerial functions throughout the mining industry.

Engineers

Both skilled workers with experience and technicians are eligible, after a year's training at an Upper School of Technology, to study at a professional engineering school. The standard course of studies in such a professional school lasts three years and, through classroom lectures and training, teaches the student to solve practical problems. Upon graduation, the engineer is qualified for supervisory and managerial functions in the mining industry. The leading positions in both industry and government are often filled by such graduates. Such an engineer can continue his studies, either at a technical college or a university, as a graduate engineer. In addition, after gaining some on-the-job experience an engineer may take further training courses in management or in a more specialized technical field.

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134 Id. at 7.
135 Id.
136 Id. at 8.
137 Id. at 7.
Graduate Mining Engineers

Graduate mining engineers are in a category distinct from the engineer with practical training as described above. These engineers are university graduates who have attended one of the three graduate beginning courses in the Federal Republic at the Aachen Technical College, the Berlin Technical University, or at the Clausthal Technical University.\(^\text{138}\)

\(^{138}\) Id. at 8. See also interview with Hans Berg, supra note 72.
I. Semi-skilled worker path: 18-year-olds

- 1) Juveniles not able to go through theoretical trng.
- 2) Foreign workers

Training
- Trained to work in the mine: practical skills plus German lang. instruction—may be trained with apprentices’ time?

Work
- "Semi-skilled worker"

II. Career path

A. "Skilled workers": 18-yr-olds

Must have completed elementary school, and in some cases part of high school

Training
- Trained as apprentices—technical/classroom plus practical/face trng.
- 2 (min.)-3½ yrs. depending on specialty; most take 3 yrs.

Exam with Chamber of Industry and Commerce

Work
- "Skilled worker" includes: miners for hard coal or ore mining mine surveyors, dresser repairman, etc.

A. "Skilled worker" w/ adv. trng. to be hewer, shotfirer, fireman, etc.

Several yrs' work as a "skilled worker" plus a special trng. course in the area

Face exp.: 2 yrs. Optional: attendance at "preschool of mining"

B. "Technician" "Steiger"

Training: "Miners Technical School" 2 yrs.

Work
- Many supervisory and managerial responsibilities

Full-time, 3 yrs. part-time

C. Engineer

Training (1) "Class 12" Upper Sch. of Tech.

Work
- Extended supervisory and managerial functions

D. Graduate Engineer

Addit'l University Studies

Work
- Graduate Engineer
Poland

Coal Industry

Coal is a major industry in Poland. In 1976, the industry employed 300,000 persons in seventy underground mines, which produced 200 million tons. Estimates are that eighty-five percent of the mining operations are longwall, making a total of 667 longwalls, 155 of which are mechanized. Poland is the fourth largest hard coal producer in the world, the second largest coal exporter in the world, and the largest coal exporter in Europe. The country has the fourth largest coal reserves in the world, amounting to 155 billion tons. Coal is mined in three major areas in Poland: the upper Silesian Basin, the lower Silesian Basin, and the Lublin Basin. Eighty percent of the coal comes from the upper Silesian Basin, while the Lublin Basin has been developed only recently.

Polish mining exhibits characteristics that make it somewhat unique. One such characteristic is the presence of excessive amounts of methane gas: the mines in the Rybnik Region have the world’s highest methane content. In fact, the Moszczenica mine is considered the gassiest mine in the world. Additionally, Polish coal seams are among the thickest in the world, and furthermore, the country’s mines are often located near settled areas, often under towns or industrial complexes. These factors require that special precautions be taken. For example, extensive storing or backfilling is used to fill in mined-out areas.

139 Interview with Adam Szczurowski, General Director, Central Mining Institute in Katowice, Poland, June 1977. Notes from the interview are on file with the authors.
141 Id.
142 Interview with D. Sc. Leszek Tunarzewski, Methane Specialist, Moszczenica mine, in Jastrzebie-Zdroj, Poland, June 1977. Notes from the interview are on file with the authors.
143 Interview with Polish Ministry of Mines officials: Mgr. inz Edward Czyz, Dyrektor Departamentu, Wyzego Urzedu Gorniczego, Mgr. inz Tadeusz Zygielowicz, Adam Szczurowski, D. Sc. Mining Engineer, General Director, Central Mining Institute, in Warsaw and Katowice, Poland, June 1977 [hereinafter cited as interview with Polish Ministry of Mines officials]. Notes from the interview are on file with the authors.
Polish fatality and accident figures are not available. One indicator of the safety needs is the frequency of emergency rescue operations. Available information shows that in 1976, there were forty-eight rescue operations for gas explosions and fires, twenty-eight for falls, one for a water hazard, and five for miscellaneous reasons.144

The mines in Poland were nationalized in 1946 and are now under the authority of the Ministry of Mining and Power.145 Each mine operates under a system of plan submission. The directors of each mine must submit for approval a plan for mining their assigned coal property in an economically justifiable manner and with adequate means of assuring miner health and safety, as well as assuring protection of the deposits, the overlying real estate, the underground installation, etc. This plan is to be approved by the regional Bureau of Mines, which is part of the Supreme Bureau of Mines.146

**Health and Safety Laws**

In addition to the health and safety portions of the mine directors' approved plan, there is a general health and safety law that governs mining as well as all other industries, with provisions covering the workplace, machinery, health, and medical care.147

In 1977, a revision of Polish mining legislation provided that all mines “must be designed, built, and maintained in compliance with the law and requirements of modern science in a manner that will ensure their safety with respect to people and property and that will protect the environment.”148

**Enforcement**

There are four groups in Poland which have inspection powers in the mines. The first is the Supreme Bureau of Mines, oper-
ating through its regional offices. These officers supervise and control operations, and can issue instructions to the miners or close the mines when appropriate. The offices oversee rescue operations and investigate accidents. The Bureau is also responsible for formulating rules and regulations for the industry.

The second group consists of the labor inspectors. These individuals have the power to enforce any labor regulations. They are Trade Union people, appointed by the Board of Directors of the Trade Union. They can enter the premises at any time and demand information. They can order management to abate violations and can order closure of the mine or stoppage of work at the face where the regulations are not being followed. They can also order the transfer of workers away from area that evince dangerous conditions.

The third inspection group with power over the mines is the prosecutor, who has jurisdiction whenever there is a violation of the penal code. The prosecutor is permitted to inspect wherever it is necessary to do so in order to determine whether there are violations of that code. Examples of penal violations are “extracting coal in a prohibited manner” and “causing danger to the national economy.” If the damage is considered to be serious, the offender risks a prison sentence there is a possible of two to ten years. Offenses which would result only in a fine are failure to inform the regional office of an accident, failure to draft a plan of operation, or permitting unqualified persons to operate machinery.

The final group with inspection power is the workers themselves. They have power to investigate violations of the occupational health and safety law, and can make recommendations to improve working conditions or to improve the plan for the mine. However, the Council of Ministeries and the Central Council of Trade Unions control the timing of these inspections and determine whether the changes and recommendations will be

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149 Interview with T. Sadowski, European Law Division Library of Congress 1977. Notes from the interview are on file with the authors.
150 Decree of October 21, 1954, at 5; See also interview with T. Sadowski, supra note 149.
151 Interview with T. Sadowski, supra note 149.
152 Id.
Responsibility for health and safety is divided among several authorities. The managers of the individual mine, as noted above, must come up with a plan for the mine that incorporates provisions to protect the health and safety of the miners. The management is also responsible for informing miners on health and safety issues. The Inspectorate has the responsibility of enforcing compliance with the law both by management and by the workers themselves. Every coal face is to be inspected once per month, and each mine is to be fully inspected four times per year.

**TRAINING AND EDUCATION**

An extensive system of training is administered by the Ministry of Mines and cooperating authorities. In 1976, more than sixty secondary-level mining schools and over 120 basic mining schools were in operation. In addition, most of the larger coal mining establishments operate training and apprenticeship programs.

In general, training procedures and regulations are relatively uniform throughout the industry. School training is given in basic mining school, mining technical schools, and at the mine training center. Training is the joint responsibility of the government and the mine manager. About 40,000 new young miners are trained each year in Poland.

**New Entrant Training**

As with other countries, there are several methods of entering the Polish mining industry. By one method, a person may go into the basic mining school directly from primary school. Students

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153 Id.
154 Interview with Polish Ministry of Mines officials, supra note 143.
155 Id.
156 Id.
157 Id.
158 Id.
159 Report by the Executive Committee of the Polish Miners Union on Training (presented June 1977) [hereinafter cited as Polish Miners Union Training Report]. Report is on file with the authors.
160 Id. at 4.
aged fourteen to fifteen years will often enter one of the basic mining schools rather than attend an academic secondary school. On the average, there are about two such schools for each mine, located predominantly in the mining areas, which provide classes both in mining and in general academic subjects.

The three-year course of these basic mining schools begins with classroom work and then gradually introduces the student to the coal mining operation. Topics include safe use of machinery, mine operations, and health and safety regulations. Approximately fifty percent of the student’s time is focused upon direct job training, while the remainder is devoted to academic studies which include mathematics, mechanical drawings, physical sciences, and general educational topics. Thus, the new entrant miner at the end of the three years has experienced several jobs and has worked as a trainee under direct supervision during the greater part of the course. Each year approximately 15,000 students graduate from these schools and enter the mines.

An option to the three-year school training is an apprenticeship of sorts, in which a “young miner” accompanies an experienced “miner” until he has been trained. This system is of historical derivation, and at this time it is not officially favored by the mine management. No statistics were available as to the number of miners who came through this system, although the Ministry officials indicated that it was quite small.

An additional method of training is required for newly-hired inexperienced miners, i.e., men who are over the age of eighteen and are entering the coal mining industry for the first time. This

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161 INTERNATIONAL LABOR ORGANIZATION REPORT, supra note 98, at 45.
162 Interview with Polish Ministry of Mines officials, Katowice, supra note 143.
163 Polish Miners Union Training Report, supra note 159, at 4. See also interview with Polish Ministry of Mines officials, Katowice, supra note 143. Each mine in Poland employs, on the average, 4,000 miners. It should be noted that the methods by which the mines are operated differ substantially from those of the United States. Almost all machinery for the mine is built and maintained at the mine shops. Uniforms and clothing are sewn, repaired, and washed out at the mine laundry, and the mine cafeteria feeds the mine population at least one meal a day from the mine kitchen. Interview with Polish Ministry of Mines officials, supra note 143.
164 Interview with Polish Ministry of Mines officials, Katowice, supra note 143.
training is conducted at each mine training center, with a minimum of 200 hours required for each miner.165

Introductory training begins with a one-day classroom induction, followed by twenty-five days of in-mine training and then three days of classroom training. The in-mine training, conducted by training instructors, covers safe use of mining tools; mining methods and systems procedures for supporting roof, rib, and face; haulage and transportation safety; mine hazards, dangers, and precautionary procedures; and general geological principles. This schooling is generally conducted at or near the mines, and enrollment is usually limited to the needs of adjacent mines.166

At weekly intervals throughout the three-year program discussed earlier, the students alternate studies with work.167 On-the-job training is gradually introduced, beginning with training in the use of tools and equipment in workshops during the first year. In the second year, above-ground simulated mining conditions are introduced. During the third year, students train and work in underground situations. The students are compensated on an increasing scale during the three year period. Basic mining school graduates are full-fledged mineworkers who, upon qualification, can attend a technical school for an additional three years of training. However the majority enter the mine upon graduation.168

**Mining Technical Schools (Technikum Gornicze)**

Secondary school graduates who wish to enter the industry can go straight to a technical school and complete technical training in two years.169 Technical school candidates include: graduates of the basic mining schools, secondary school graduates, and students who enter directly after completing primary school. This latter group will undertake a five-year program before graduation.170

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165 MSHA INFORMATION REPORT, supra note 34, at 29.
166 Interview with Polish Ministry of Mines officials, Katowice, supra note 143.
167 INTERNATIONAL LABOR ORGANIZATION REPORT, supra note 98, at 45, 46.
168 Id. at 45.
169 Id.
170 Id.
The technical schools train students in "the technical exploitation of coal deposits, the operation of underground electrical tools and machines, measurements in mines, mechanical processing in mines, construction and repair of mining tools and machines, automation in mining, mining electronics, and the economics and organization of mines." In addition to the standard day courses, the school offers night and correspondence courses for working miners.

Technical schools rely to a greater degree on theoretical courses rather than on the practical topics covered in the basic mining schools. Students in the five-year course spend four days a week in the classroom and one day a week at work, except that the entire last year is spent in classroom studies. In addition, these schools offer liberal arts courses to students who did not complete secondary school. Upon graduation, students normally enter the mine as skilled craftsmen.

Basic Mining Schools

The basic mining schools mentioned above focus on training in practical safety, including the safe use of all tools and all mining machinery, safety and hazards awareness, and means of avoiding accidents while increasing production. The schools of accident prevention instructs students in procedures for the safe use of electricity, the system of signals used at the mine, dust control, ventilation, fire prevention, fire fighting, and mine supervision and authority.

The final three days of classroom training emphasize health and safety regulations and mine management procedures. In the Polish program, the training instructor and the immediate supervisors have the responsibility to see that an inexperienced miner is adequately trained in health and safety procedures.

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171 Id.
172 Id.
173 Id.
174 Id. See also interview with Polish Ministry of Mines officials, Katowice, supra note 143.
175 Interview with Polish Ministry of Mines officials, Katowice, supra note 143.
176 MSHA INFORMATION REPORT, supra note 34, at 20.
177 Id. at 19.
Engineering and Supervisory Training

Graduates from the technical schools who qualify can be admitted to one of the schools of higher education operated by the Ministry of Science, Higher Education and Technology. First class mining engineer degrees require four years of training, and an engineering master's degree requires an additional two years. During the first three years, all mining engineering students take similar courses. During the fourth year, students specialize in underground exploitation, mechanical processing, mining construction, engineering economics, mining mechanization, or electrical engineering as it is applied to mining. Engineering students also receive instruction in mathematics, draftsmanship, physical sciences, managerial and personnel problems, and a foreign language. The placement function for Polish supervisory positions is undertaken by the schools from which the student graduates.

Retraining at All Levels

All miners, including the mine managers, are required to have sixteen hours of annual retraining. This retraining is conducted either at the mine training center or underground during working hours. Two hours is the shortest amount of time that such a segment can last. Instructors from the Ministry of Mines make presentations in accident prevention, health and safety standards, causes of accidents, and violations of health and safety standards at the particular mine.

One example of a sixteen-hour annual retraining course includes:

1. Miner's Responsibility in Health and Safety ........................................ 3
   a. Operational Rules
   b. Labor Codes
   c. Worker Regulations
2. First Aid ........................................ 1

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178 INTERNATIONAL LABOR ORGANIZATION REPORT, supra note 98, at 45.
179 Id. at 45, 46.
180 Interview with Polish Ministry of Mines officials, Katowice, supra note 143.
181 Id. See also MSHA INFORMATION REPORT, supra note 34, at 20.
182 MSHA INFORMATION REPORT, supra note 34, at 20.
3. Review of violation records .................................. 3
4. New developments in mine health
   and safety ............................................. 1
5. Control of coal dust explosives
   and mine flooding ................................... 2
6. Fire protection and equipment ............................. 1
7. Mining machines and installation ............................ 3
8. Mechanical and electrical safeguards ...................... 1
9. Communications and signals ............................... 1

After completion of the annual refresher courses, each miner is required to successfully complete a qualifying examination. The test emphasizes knowledge of health and safety regulation and the practical means to comply with it.\textsuperscript{183}

The miner who fails the examination is transferred from his regular occupation during production shifts, which results in a decrease in pay. Each unsuccessful candidate may take additional examinations at fourteen-day intervals.\textsuperscript{184} If he cannot successfully complete the examination, he is permanently moved to a less desirable job.

Polish mines are large and dangerous. The country, for obvious reasons, has made a commitment to large-scale exploitation of its coal reserves. The industry is still labor intensive, even though great efforts of mechanization have been undertaken. Training and certification is a matter of serious concern. For the responsible governmental agencies, the amount of time and effort spent in training reflects that concern.

\textsuperscript{183} Id.

\textsuperscript{184} Id. See also interview with Polish Ministry of Mines officials, Katowice, supra note 143.
A COMPARATIVE STUDY

POLAND

Age 14
- Apprenticeship accompanies experienced miner
- Basic mining school
  - 3 years
  - Includes in-mine training
- Minimum
  - 200 hours
  - 1 day class
  - 25 practical
  - 3 class

Mineworkers:
- for exploitation of coal deposits
- mechanic for underground tools and underground electrician

Etc.

Mine Technical Schools
- 3 years
- Includes 2 months work in mine

Work in:
- Mechanical Processing
- Automation in Mining
- Electronics
- Craft positions
- Economics and organization of mines
- Etc.

Age 14-16
- Secondary School

Mineworkers:
- Includes 2 months work in mine

Mine Technical School
- 2 years

Etc.

Age 16-18
- Primary School

Mine Technical School
- 5 years

School of Higher Education
- 4 years
- 6 years

Engineer:
- Electrical
- Mechanical
- Etc.

Masters:
- Engineering
- Electrical
- Mechanical
- Etc.
Romania

COAL INDUSTRY

The coal industry of Romania is small by worldwide standards, but the industry is very important in terms of the Romanian national economy, and has been growing in recent years. Figures for 1975 show that in that year the country's mines employed approximately 53,000 people and produced over 27 million tons of coal. Of this coal, just over two-thirds comes from surface mine operations, while the remaining third is produced by underground operations which utilize nonmechanized longwalls. While no written health and safety statistics were available, the Ministry of Labor indicated that in 1977, approximately thirty miners died in mine accidents. Coal workers are the highest paid industrial workers in the country.\textsuperscript{185}

HEALTH AND SAFETY LAWS

The government agencies responsible for mining are the Ministry of Mines, Petroleum, and Geology, and the Ministry of Labor. In addition, the Trade Union for Mines, Petroleum, Geology and Electrical Energy actively participates in health and safety matters.\textsuperscript{186} The industry is governed by a national law for labor safety, with which all ministries, agencies, and managerial organizations must comply.

Annually, the director of each mine is required to submit a mining plan to the Ministry of Mines, and these plans are reviewed by the Mining Inspectorate. The plans cover every aspect of mining, including production, health and safety, and training.\textsuperscript{187} The Mining Inspectorate, as part of the Ministry of Labor, has the responsibility of inspection and law enforcement, while the Mining Ministry is responsible for the production plans and

\textsuperscript{185} Interviews with officials from the Ministry of Mines, the Ministry of Labor, and the Trade Union, Bucharest, Romania (June 1978) (included a mine site visit). Among the officials were Mr. R. Aculai, Chief Protocol Officer, Ministry of Mines, Petroleum, and Geology; Oniciu Avram, General Director, Filipestii DePadune Mine; Mrs. Ursescu, Inspectorate, Ministry of Labor; Mr. Frunza, Trade Union for Mines, Petroleum, Geology and Electrical Energy. Notes of interviews are on file with the authors.

\textsuperscript{186} Id.

\textsuperscript{187} Id.
the safety and health plans. The Mining Permanent Inspectorate includes one inspector per mine. The Inspectorate investigates all fatal or otherwise serious accidents, but not minor ones, and inspects every gassy mine once per day. Worker representatives also inspect the mines. Sanctions available against managers who fail to comply with the health and safety statutes include economic penalties (fines), discharge, and prison terms.

Responsibility for safety generally is vested in the Ministry of Labor because, according to the officials of that Ministry, if responsibilities were placed with the Ministry of Mines "they might be tempted to be influenced by production."

**TRAINING AND EDUCATION**

Training requirements are of recent origin in Romania. Training plans are part of the general mining plan prepared by each mine and reviewed annually under the auspices of the Ministry of Labor. The plans cover the training of both miners and supervisory personnel.

As is typical of the system in most countries, candidates for the Romanian mining industry arrive through different avenues and therefore the training program cannot easily be summarized in general terms. The present training scheme in effect in Romania is of recent origin. For the most part, the training program for mining is similar to those of the other industries in that each industry branch has a division for education which coincides with the public school education scheme.

**New Entrants**

By law, a minimum education of ten years is compulsory for all Romanian youths. Eight of those ten years are devoted to general education, while two years are reserved for specialized education and training. In the mining communities, the two years of specialized training are spent covering mining in general, along with related subjects such as mathematics, mechanical drawings,

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188 *Id.*
189 *Id.*
190 *Id.*
191 *Id.* Mr. Katz, of the Ministry of Labor's Inspectorate Office, indicated that the present legislation regulating training had been recently enacted. *Id.*
etc. This is the first stage of practical training for the student’s future vocation.

After these two years, other educational opportunities are presented, according to the Ministry of Labor. Currently, sixty percent of the general population pursues at least an additional two years of education. This second stage provides an even more specialized training and might produce, for example, a mining electrician. General courses are included in this specialized training program as well. And significantly, in each program a labor safety course is incorporated, and mining students are trained in workshops on training faces where they are available.

After graduation from the two-year secondary school, the graduates’ career paths diverge, some leading to the mines and others leading to college or technical school. New-entrant miners who finish the additional two-year program must then complete a period of six to twelve months as a trainee before qualifying to become a full-fledged miner. Other students enter professional school or college. This professional school trains students for one and one half years in a speciality, such as mine mechanics.

A third category of students do not pursue more specialized training upon leaving secondary school, but instead accept a job and undergo training sponsored by their employer. In mining, this 6-month training program includes training in both practice and theory as well as general testing regarding health and job qualifications. After the six-month term, the miner takes an examination. If he passes, he is accepted; if he fails, the training is extended for another month and a new exam is given. If the candidate is still unsuccessful, he might be assigned to a job on the surface. Upon successful completion of the examination the miner is assigned to work underground.

At the Filipisti Padune Mine inquiries indicated that sixty
percent of the miners had received their initial training at the mining school; twenty-five percent had been trained in the training school; and fifteen percent had received their training at the mine training center. This last category was comprised of the unskilled workers at the mine.200

A new-entrant unskilled worker might normally be sent to the mine by the labor organization to receive ten days induction training, whereupon he is assigned to a team underground and begins an apprenticeship. The older, experienced miner to whom he is assigned is given a bonus for assisting in the training.

Normally, fourteen to sixteen year old entrants are assigned to the state mining school. Under this practice a representative of the State and the parents of the boy sign a contract by which the Mining Ministry pays for the youth's education (and possibly a stipend to the parents).201 The students study general cultural, technology, geology, general principles of mining, mineral science, and electrical safety. The teachers are specialists who work at the mine. About five percent of the mine work force comes through this program.

Within the past four years, every mine has organized a Worker Commission, made up of workers elected by their fellow employees, which is responsible for reviewing the training conducted at the mines.202

**Supervisory Training**203

Mistro Training: After qualifying as a full-fledged miner and

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200 Id. (taken primarily from the mine visit).
201 Id.
202 Id., primarily interview with Union Officials.
203 The supervisory hierarchy in Romania, from the lowest position to the highest, is structured as follows:
   - Chairman of the Brigade (the worker responsible for the working face and supplies)
   - Foreman - Mistro (roughly 6 or 7 men per crew) (supervises face work)
   - Main Foreman - Mistro (major)
   - Sub-Engineer - Director
   - Production Engineer (responsible for all 3 shifts)
   - Electrical Engineer, Mechanical engineer
   - CH. Engineer (CH) (if mines have 5,000 or 6,000 miners)
   - Technical Director for Development (research; investment; long-term
after having worked a minimum of one and one half years, miners may apply to the management for the mine for nomination to the foreman (Mistro) school, operated by the Ministry of Mines. The managers at each mine submit names of candidates they consider worthy. Based upon the results of an examination given at the mines, a competitive exam is then conducted by the Ministry (there are more applicants than there are available positions), and the ranking students are accepted into the school. Upon graduation, each Mistro is “certified” and may then apply for a position at any mine.

The Main Mistro is the next higher position in mine management. A Mistro may become the Major or Main Mistro after having accumulated a period of work experience and after having completed additional courses.

**Sub-Engineer - Director**

The next hierarchial position is that of sub-engineer. After completing three years of academic studies specialized in an aspect of mining, a Mistro is eligible for the position of sub-engineer. At the completion of the three-year course, the sub-engineer enters the mines with a production job. During the next two years, which are probationary, the sub-engineer undergoes additional practical training, rotates among various jobs, and works on particular engineering problems at that mine. During that period, he sometimes acts as a Mistro or may may fill in for the Main Mistro. At the successful culmination of this work period, the sub-engineer receives certification.

**Engineer Director**

The miner who aspires to become an engineer or director normally follows the same practical training route as the Mistro
or sub-engineer. However, he must have completed twelve years
of school and five years of work experience before he will be con-
sidered.\footnote{Id.\footnote{Id.}} He must complete a competitive national examination
to be eligible for admission to one of the two national mining uni-
versities. His studies are similar to those of the sub-engineer, but
with an additional two-year project consisting of a practical min-
ing engineering problem. Both the sub-engineer and engineer pro-
grams are jointly approved by the Ministry of Education and the
Ministry of Mines.\footnote{Id.}

The engineer also has a three-year probationary work period
similar in structure to that of the sub-engineer. The internship
involves rotating among various mining jobs and dealing with a
variety of problems. At the successful culmination of the three
years, he becomes a certified engineer. The training periods are
normally established by law, although there are some exceptions
allowed by the Mines Ministry and the Inspectorate.\footnote{Id.}

Retraining

All miners and supervisors undergo periodic retraining, al-
though no specific minimum time requirements are mandated by
regulation. Although a miner or supervisor can have his authori-
zation removed if he fails to show the proper conduct, no statis-
tics were available as to the frequency of this deauthorization.
The Mining Ministry conducts periodic training at the mine site,
with the exception of training in the use of gas equipment, which
occurs at the factories.\footnote{Id.}
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<thead>
<tr>
<th>Role</th>
<th>Training Duration</th>
<th>Experience Required</th>
<th>Further Education</th>
<th>Future Role</th>
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<td>New (Secondary School)</td>
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<td>with a company</td>
<td>2 years special</td>
<td>Mineworker</td>
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<td>Mine mechanic Etc.</td>
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France

Coal Industry

The French mining industry has declined since World War II. The country currently produces approximately 20 million tons of coal per year, while consuming an annual amount of about 34.5 million tons.211 Mining activity occurs primarily in the northern and eastern regions.212

Since nationalization in 1945, the coal industry in France has been operated by the government-owned Charbonnages de France. Charbonnages de France, as such, is the primary organization responsible for the health and safety of the country’s coal miners, and through its coal mining research institute, Centre d’Etudes et Recherches des Charbonnages de France, and its center for safety and health, Centre National de Perfectionnement des Cadres, it initiates, develops, and administers programs to make coal mining more safe.213

Training and Education

The present French training program began roughly twelve years ago. At that time, Charbonnages committed itself to the principles that everyone is to be trained, and that everyone including supervisors is to receive frequent retraining. An industry-wide program entitled “Training Within the Industry” (TWI) was established to review the training needs and to develop programs which would fulfill those needs. While there is no obligation on the part of any miners or supervisory personnel to participate in any training that is not statutorily required, job improvement training is strongly encouraged, and job advancement is often based upon such participation.214

Further, the supervisory training contains an element which

211 Telephone interview with Charbonnages de France officials in Washington, D.C. (May 1980).
212 Id.
213 Id.
214 Interviews with officials of Charbonnages de France, including Monsieur F. Pott, Director, General des Services Techniques; Mr. L. Larreur, Service Securite; and Mr. R. Grisard, Ingenieur Principal Chief de Service Security des Mines, in Paris (June 1978) [hereinafter cited as interviews with Officials of CDF]. Notes of the interviews are on file with the authors.
makes it somewhat unique. Recognizing the phenomenon that supervisory personnel not only are not completely familiar with every problem, but are also somewhat reluctant to admit such a lack of knowledge or experience, the refresher training for supervisors requires that they undergo some basic courses which, for instance, require them to perform simple and mundane jobs in a safe manner so that they can properly instruct the miners by drawing from personal experience.

Another element of uniqueness is the extensive use of films for training purposes. Films are perceived as a means of creating motivation among the miners and supervisors. They are used throughout the training classes and are also shown as shorts in bathhouses before and after shifts to highlight particular problems.

**Training Faces**

French training includes time spent on a training face or schooling face where production is not the primary goal, but instead training is the major consideration.

**New Entrants**

As in other countries, French miners enter the industry by several different avenues. Approximately ten percent of all new entrants are Moroccan guest workers. Two other main classifications of new entrants are domestic mineworkers below eighteen years of age and those above eighteen. Training is also typically divided between skilled workers, including those who aspire to the supervisory ranks, and semi-skilled workers.

Presently, the training program for new entrants in each area is operated independently, and no national time period has been established, although basically the areas utilize similar training programs.

The training scheme for the French worker who is over the age of eighteen and entering the industry for the first time begins

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215 Id.
216 Id.
217 Id.
218 Id.
with two weeks (paid) surface training, principally in the classroom, followed by a test with judges his understanding of mining basics. After successful completion of this program, the miner and mine management together decide whether the miner will enter the Fellowship for Specialists apprenticeship program or begin training on the training face.

The semi-skilled worker will go to the training face or school face for three to four months, until such a time as he is judged able to accept actual production-face responsibility. The school faces or school sections have low productivity because priority is given to the training of workers. In the Lorrain coal fields, one such face is maintained in each mine.\footnote{Id.}

**Foreign Workers**

In France, “guest” workers come principally from Morroco or Tunisa under a contract with Charbonnages for two years. Frequently, the contracts are renewed two or three times. Normally, however, the length of a guest worker’s stay is not over six years. The foreign workers are primarily assigned to the semi-skilled face jobs.\footnote{Interview with Rene-Francois Bernard, Ingenieur des Mines, Service old l’Industrie et des Mines et Dovai, France, (June 1978). Notes from the interviews are on file with the authors.}

Initially, guest workers receive two weeks training on the surface, with four hours of each day devoted to elementary safety points and four hours to the study of the French language. They are then assigned to the face, normally a production face, under a trainer or supervisory workman. During this training period, they are not paid for production as are the other workers, but instead receive (lower) trainee pay. These trainees are not permitted to work alone until the trainer believes that they can do so safely. The trainers are compensated for their training responsibilities.\footnote{Interviews with officials of CDF, at Dovai (June 1978). Notes from the interviews are on file with the authors.}

**Fellowship For Specialists**

For French miners wishing to become skilled workers or supervisors, the training continues after the introductory two weeks

\footnote{Id.}
through the Fellowship for Specialists, such as mechanics, electricians, etc. If the candidate is below the age of eighteen, he enters a two-year apprenticeship program, which entails training at one of the company-operated training centers. This training is conducted both in the classroom and in a hands-on vocational setting as well as at the particular mine where he is to be employed.\textsuperscript{222}

The miner who is over the age of eighteen spends six months in schools at the mine site, with his time being divided between surface and underground periods. Training on the school face concentrates on the specific topic or job for which he is training. The Fellowship training then continues for the remainder of the two-year span in which the trainee works under the control and supervision of a skilled craftsman. Both the Fellowship program and the apprenticeship program are prerequisites for miners desiring to become specialists or supervisors.\textsuperscript{223}

\textit{Instructor Training/Workmen Trainers}

The French training program pays particular attention to the need for training of the instructor. Trainers are chosen from among the workmen at a mine. Approximately two new instructors per 1,000 miners are trained each year, becoming full-time trainers charged with the initial training responsibility as well as the responsibility of following up the initial training program. These trainers are paid the same wages as those paid when they were miners, and the worker trainer position can lead to a post on the mine safety staff or qualification for the position of foreman. These trainers handle the two-week induction training in small classes of about twelve trainees using films and exercises developed by the national training office and using practice equipment. Finally, such worker trainers monitor the progress and accident experience of the miners who have gone through his training program.\textsuperscript{224}

\textit{Foreman}

The practical training program begins with the worker who wishes to become a foreman. Following a period of employment at

\textsuperscript{222} Interviews with officials of CDF, supra note 214.
\textsuperscript{223} Id.
\textsuperscript{224} Id.
the mine (which varies depending upon the worker’s age at entry), the miner can begin the foreman training program. Approximately 100 to 150 foreman candidates are graduated each year. Miners who enter the industry after eighteen years of age normally begin after three to four years of work experience and attend school for one year on the average.

Young miners who begin the apprenticeship program before the age of eighteen must complete three to four years experience, and then are required to attend school for a period of six to nine months while concurrently undergoing practical training. These two groups are then qualified for first degree certification as foreman.

The second degree candidates are successful first degree foremen who have worked in that capacity for a minimum of two, but normally four to five, years. The third degree candidates have completed the first and second degree programs and a minimum of two additional years, although again, four to five years practical work experience is the norm.

During these periods of work, the candidates are required to attend Work Improvement Courses. These are short courses at training centers, varying in duration from two days to two weeks, and covering, for example, electrical subjects, or technical subjects, or management topics such as organizing the work force, human relations, safety behavior, and mine economics. The training is part of the program that is administered internally by the industry, mentioned above.

During the course of the training program, the candidate is given practical examinations that test the ability to solve concrete problems. In addition, each candidate must sit before a jury made up of specialists, among which are specifically included an inspectorate representative and a mining engineer. The candidate must satisfy this jury of his competency in the particular field before he is allowed to continue with the program.

Although wages are adjusted for successful completions of a particular degree, there are no formal certifications or degrees granted in this program, nor is there any requirement for a specific university degree even to become the General Director of the
Retraining

The French retraining program is tied to the concepts of follow-up and refresher, and is incorporated as part of the overall training program. Every miner and supervisor participates in the three- or four-year rotation scheme under which he takes refresher courses based upon his job. No specific hours are established by regulation and, as mentioned above, the programs differ in duration and content because each area is independent.

Supervisory Training

Supervisors are trained either through the academic university system or through the practically-oriented, worker-related training program. Not all French mine superintendents are university graduates. Eighty percent of the supervisory personnel are graduates of Ecole Engineering, a system of schools roughly the equivalent of American technical colleges. A student would enter the Ecole Engineering program after completing primary school, secondary school, and baccalaureate school. Alternatively, university mining engineering degrees are granted by several of the universities throughout France.

Most of the remaining twenty percent of mine supervisory personnel have come up through the ranks as skilled miners and foremen, and after having attended night courses, have been tested to qualify as supervisors.227

Australia

Coal Industry

Coal is the leading mineral produced in Australia. In recent years the industry has been expanding, and Australia is presently the tenth largest producer of black (bituminous and anthracite) coal in the world. Figures for 1976-1977 (fiscal year) show production of 30 million tons of brown coal, and for 1977-1978, 87.8 million tons of black coal, with employment of approximately 23,000

226 In French mines, the General Director is tantamount to a superintendent of a mine in the United States.

227 Interviews with officials of CDF, supra note 214.
A COMPARATIVE STUDY

mineworkers.228

Australia has large coal reserves, comprising five percent of the world's total, which is enough to mine for several hundred years at current extraction rates.229 Australia is also a major exporter of coal. In 1977 it ranked third among exporters, accounting for 17.9% of the international trade.230

Major coal production occurs in two areas of the country: the Bowen Basin in Queensland, and the Sydney Basin in New South Wales. In 1978 the coal production in Queensland accounted for 24.9 million tons and employed 6,180 men.231 Most of the operations in Queensland are surface operations; open-cut mining accounts for two-thirds of the employment and seven-eighths of the production.232 The 1978 safety records show no fatal accidents.

New South Wales is a larger producer of coal than Queensland. Most of its production (about seventy-six percent) is from underground mines, although surface mining activity is increasing.233 Only about ten percent of the underground operations in New South Wales employ longwall mining systems, but government policy now seeks to increase longwall capacity. Accident figures in New South Wales for 1976-1977 show sixty serious accidents, eleven of them fatal, with an additional fifty-one dangerous

228 JOINT COAL BOARD, NEW SOUTH WALES, THIRTY-FIRST ANNUAL REPORT 1, 3 (1978); THE QUEENSLAND COAL BOARD, TWENTY-SEVENTH ANNUAL REPORT 80 (1978).
230 About three-quarters of this trade is with Japan. Japanese corporations have part ownership in a number of Australian mines.
231 General trends in the Australia coal industry indicate increasing exports; a shift from underground to surface operations; a corresponding decrease in the number of underground mines (although there has been a concomitant increase in the average size of deep mines); and a decreasing number of companies in the industry. Coal is projected to be the country's main energy source by 1990. NATIONAL ENERGY ADVISORY COMMITTEE, AUSTRALIA'S ENERGY RESOURCES, AN ASSESSMENT REPORT, No. 2, at 61-62 (1977).
occurrences.\textsuperscript{234}

In terms of productivity, the Australians claim that their output per man-shift is higher than that in the United States for both underground and surface operations.\textsuperscript{235}

The Government plays a consequential role in the mining industry in Australia, partly at the national but mostly at the state level. In New South Wales, the government owns and operates some of the mines, while others are operated privately.\textsuperscript{236} Because the coal industry has been an erratic, boom and bust industry, there is extensive government control over the amounts of coal produced, the production methods used, and the costs of the various facets of production.\textsuperscript{236.1}

There is legislation at both the national and state levels to regulate the coal industry. The legislative and enforcement structure, similar in both New South Wales and Queensland, is based generally on the British regulatory system.\textsuperscript{237}

In New South Wales there are two basic laws controlling the mining industry. The first is the Coal Industry Control Act of 1946, passed by the national and state Parliaments. This Act established the Joint Coal Board largely because of the need to increase output and reduce industrial unrest.\textsuperscript{238} The Board has wide powers and functions which enable it to take any necessary action to ensure coal is produced in sufficient quantities to meet requirements; to ensure coal resources are developed to the best advantages in the public interest; to ensure that the coal produced is distributed and sold in ways to ensure economical use of the mineral; and finally to promote the welfare of the men engaged in the industry.\textsuperscript{239}

\textsuperscript{234} JOINT COAL BOARD, NEW SOUTH WALES, THIRTY-FIRST ANNUAL REPORT 36 (1978).

\textsuperscript{235} Interviews with Glen Toyer, of the Joint Coal Board, in Sydney (November 1979). Notes from the interview are on file with the authors.


\textsuperscript{236.1} Id.


\textsuperscript{238} H. ANDERSON, COAL MINING 36 (1977) (Australian Industries Series No. 13).

\textsuperscript{239} Coal Industry Acts, 1946.
Responsibility for training rests in part with the Board. The other work performed by the Board is largely in research and development for the industry.

HEALTH AND SAFETY LAWS

New South Wales safety regulations come under the Coal Mine Regulations Act, which is administered by the New South Wales Department of Mines.\textsuperscript{240} There are extensive safety standards covering things such as dust suppression, ventilation, etc. The Department also approves equipment for use in the mines.

The Queensland regulatory structure is quite similar to that of New South Wales. The Coal Industry Control Act and the Coal Board control the major facets of the industry, research and development, etc., much like the Joint Coal Board in New South Wales. The Coal Mining Acts regulate the mines themselves and the safety conditions that prevail in them.

TRAINING AND EDUCATION

Apprenticeship training provides the backbone of miner training in both New South Wales\textsuperscript{241} and Queensland.\textsuperscript{242} The federal government has instituted a national employment and training scheme to encourage apprenticeships, to provide training allowances, and to expand training programs. Until very recently, it was the only method utilized throughout the country.\textsuperscript{243} Apprenticeship training is provided for the trades most generally recognized, and a great deal of the training for apprentices is done at publicly-supported technical schools in the mining area.\textsuperscript{244}

In Queensland the mining legislation and accompanying regulations do not provide for mandatory training. There the app-

\textsuperscript{240}  R. Nay \& L. Murphy, supra note 236, at 1.
\textsuperscript{241}  Interviews with New South Wales Department of Minerals officials: Kevin Winward, Research Officer; Robert Jackson, Assistant Legal Officer; Gerry Meha, Londonery Center; Glen Toyer, Geologist; Meureg Lloyd, Director; in Sydney (November 1979). Notes from the interviews are on file with the authors.
\textsuperscript{242}  Interviews with Pat Farrell, Assistant Chief Inspector, Queensland, in Brisbane (November 1977) [hereinafter cited as interviews with Pat Farrell]. Notes from the interviews are on file with the authors.
\textsuperscript{243}  International Labor Organization Report, supra note 98, at 25, 40-41.
\textsuperscript{244}  Id. at 40.
penticship methods are relied upon exclusively. 245 In New South Wales, however, there are two sets of regulations which are applicable to the issue of training.

First, under the Coal Mines Regulation Act of 1912, there are regulations for some of the supervisory jobs in the mines. 246 Part I, Divisions 1 and 2 of that Act set up the Coal Mining Qualifications Board, which is to issue certificates for competency for a variety of jobs. Section 6(1) lists the types of certification: there are first, second, and third class certifications, as well as special certification for a mine electrician or mine mechanical engineer, mine surveyor, winding or hauling engineer, or operator of electrical locomotives.

In October 1979, the Joint Coal Board issued an order 247 requiring each mine operator to prepare a proposal for the training of his workers, which training is to begin within three months of the approval of the plan. Any new mine must devise such a plan and have it approved before it can begin operations.

The order includes suggested guidelines for operators to follow in setting up these plans. The guidelines state that the training period should be no shorter than 5 work days; that it should include classroom and demonstrations; and that no worker should work underground until he has completed this training. The guidelines also include a list of suggested topics to be covered, including, as a minimum, personal safety equipment; mining health and safety legislation; precautions; restrictions; coal mine facilities; general safety; fires; and specific training for the work that the miner will be performing. The guidelines further state that once the miner begins his job he should work under the supervision of a mine official and acquire a degree of competency, after which time he can work under the supervision of an experienced miner. Moreover, the guidelines provide that miners should be tested after completing their training to ensure that they have absorbed the important points. There is also to be ongoing task training, so that any miner who takes on a new job receives prior training in that work. This is a specific requirement

245 Interviews with Pat Farrell, supra note 242.
246 Coal Mines Regulation Act of 1912, Act no. 37, as amended and reprinted in 1978.
247 New South Wales Joint Coal Board Order No. 4 (1979).
for task training.\textsuperscript{248}

\textit{Supervisors}

According to the current provisions of the Coal Mines Regulation Act,\textsuperscript{249} mine managers must have first class certification, as must a deputy manager who may take over his responsibilities.\textsuperscript{250} In a small mine, the manager only has to have a third class certification.\textsuperscript{251} An undermanager, who takes more of the day-to-day responsibilities than the manager, needs at least second class certification, as does an assistant undermanager who may take over his job.\textsuperscript{252} A deputy or shot-firer must have third class certification. The Act does not distinguish between the requirements for these three classes of certification; it seems that the Board will make appropriate guidelines in what it seeks for each. To receive such certification, one must have either five years of experience, or three years of experience in conjunction with either an engineering degree from a university, or a 2 year training course at a school of mining. To be a mine electrician or mine mechanical engineer, one must have either two years in the mines with experience on the appropriate type of electrical or mechanical equipment, or one year of experience and a university engineering degree. A mine surveyor, or a winding or hauling engineer, needs only practical experience in his work to be certified. The same is true of an operator of an electric locomotive. With the prerequisite experience, such an operator need only pass an oral or practical exam determined by the Board. The Act does not set out specific requirements. The Board has been given a great deal of discretion with respect to these qualifications.

Compared with their European counterparts, the Australian system leaves much of the responsibility for training and certification up to the discretion of the mine operators.

\textsuperscript{248} Id.
\textsuperscript{249} Coal Mines Regulation Act of 1912, Act no. 37, as amended and reprinted in 1978.
\textsuperscript{250} Id. § 4(2).
\textsuperscript{251} Id. § 4(4).
\textsuperscript{252} Id. § 4(2).
<table>
<thead>
<tr>
<th>New Employee</th>
<th>5 days training (training plan to be government approved)</th>
<th>experience under supervision</th>
<th>Miner</th>
</tr>
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<tbody>
<tr>
<td>New Employee</td>
<td>5 days training (training plan to be government approved)</td>
<td>experience under supervision</td>
<td>experience in appropriate work, Board approval</td>
</tr>
<tr>
<td>New Employee</td>
<td>5 days training (training plan to be government approved)</td>
<td>experience under supervision</td>
<td>practical test or oral exam</td>
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<tr>
<td>New Employee</td>
<td>5 days training (training plan to be government approved)</td>
<td>experience under supervision</td>
<td>2 years experience with appropriate equipment OR 1 year experience plus</td>
</tr>
<tr>
<td>New Employee</td>
<td>5 days training (training plan to be government approved)</td>
<td>experience under supervision</td>
<td>5 years experience OR 3 years experience plus</td>
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United States

COAL INDUSTRY

In 1977, the United States produced 689 million tons of coal, sixty-one percent coming from surface mines and thirty-nine percent from underground. In 1978, the industry employed 241,000 miners, who worked 267 million hours. Approximately 6,000 mines, all of them privately owned and operated, are currently producing coal in twenty-six states. Fatal accidents took the lives of 146 miners in 1979, and 22,221 miners were injured on-the-job.

TRAINING AND EDUCATION

Training in the United States is primarily the responsibility of the mine operators, although some states (e.g., West Virginia) have developed a pre-employment training program. In some areas, vocational schools historically have made efforts to provide this training. Training of miners in this country, until recently, has been regulated by the states only. Until the 1978 federal regulations, there was not a serious, rational, and systematic approach.

Under the Federal Coal Mine Health and Safety Act of 1969, Congress gave the Department of the Interior responsibility for training. Training regulations were informally pro-

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253 THE PRESIDENT'S COMMISSION ON COAL, DATA BOOK 83 (1980).
254 Id. at 127.
255 Id. at 119.
256 Id. at 93.
257 Of these, 18,111 suffered injuries serious enough to miss work (non-fatal days lost), and 3,981 miners were injured but were not counted as the days-lost category. DEP'T OF LABOR, MINE INJURIES AND WORKTIME, QUARTERLY 6, (January through December, 1979).
258 Section 317(i) of the Act, 30 U.S.C. § 877(i) (1976). "Every operator of a coal mine shall provide a program, approved by the Secretary, of training and retraining of both qualified and certified persons needed to carry out functions prescribed in this Act." Id.
Requirements were also found in section 502 (now codified, without pertinent change, at 30 U.S.C. § 952 (a), (b) (Supp. II 1978)).
(a) The Secretary shall expand programs for the education and training of operators and agents thereof, and miners in—
   (1) the recognition, avoidance, and prevention of accidents
posed and public meetings were held in 1974, but these proposed regulations were superseded by the passage of the Federal Mine Safety and Health Amendments Act of 1977. Section 115 of that Act provided mandatory health and safety training requirements and required the Secretary to promulgate regulations within 180 days of the effective date of the Act.


260 (a) Each operator of a coal or other mine shall have a health and safety training program which shall be approved by the Secretary. The Secretary shall promulgate regulations with respect to such health and safety training programs not more than 180 days after the effective date of the Federal Mine Safety and Health Amendments Act of 1977. Each training program approved by the Secretary shall provide as a minimum that—

"(1) new miners having no underground mining experience shall receive no less than 40 hours of training if they are to work underground. Such training shall include instruction in the statutory rights of miners and their representatives under this Act, use of the self-rescue device and use of respiratory devices, hazard recognition, escapeways, walk around training, emergency procedures, basic ventilation, basic roof control, electrical hazard, first aid, and the health and safety aspects of the task to which he will be assigned;

"(2) new miners having no surface mining experience shall receive no less than 24 hours of training if they are to work on the surface. Such training shall include instruction in the statutory rights of miners and their representatives under this Act, use of the self-rescue device where appropriate, hazard recognition, emergency procedures, electrical hazards, first aid, walk around training and the health and safety aspects of the task to which he will be assigned;

"(3) all miners shall receive no less than eight hours of refresher training no less frequently than once each 12 months, except that miners already employed on the effective date of the Federal Mine Safety and Health Amendments Act of 1977 shall receive this refresher training no more than 90 days after the date of approval of the training plan required by this section;
An advisory committee was established in accordance with sections 101 and 102(c) to assist the Secretary in the development of the proposed rules on training. In July 1978, after two series of committee meetings, MSHA proposed the rules and held public hearings throughout the country. The final training reg-

"(4) any miner who is reassigned to a new task in which he
has had no previous work experience shall receive training in ac-
cordance with a training plan approved by the Secretary under
this subsection in the safety and health aspects specific to that
task prior to performing that task;

"(5) any training required by paragraphs (1), (2) or (4) shall
include a period of training as closely related as is practicable to
the work in which the miner is to be engaged.

"(b) Any health and safety training provided under subsection (a)
shall be provided during normal working hours. Miners shall be paid at
their normal rate of compensation while they take such training, and
new miners shall be paid at their starting wage rate when they take the
new miner training. If such training shall be given at a location other
than the normal place of work, miners shall also be compensated for the
additional costs they may incur in attending such training sessions.

"(c) Upon completion of each training program, each operator
shall certify, on a form approved by the Secretary, that the miner has
received the specified training in each subject area of the approved
health and safety training plan. A certificate for each miner shall be
maintained by the operator, and shall be available for inspection at the
mine site, and a copy thereof shall be given to each miner at the comple-
tion of such training. When a miner leaves the operator's employ, he
shall be entitled to a copy of his health and safety training certificates.
False certification by an operator that training was given shall be pun-
ishable under section 110(a) and (f); and each health and safety training
certificate shall indicate on its face, in bold letters, printed in a conspic-
uous manner the fact that such false certification is so punishable.

"(d) The Secretary shall promulgate appropriate standards for
safety and health training for coal or other mine construction workers.

"(e) Within 180 days after the effective date of the Federal Mine
Safety and Health Amendments Act of 1977, the Secretary shall publish
proposed regulations which shall provide that mine rescue teams shall
be available for rescue and recovery work to each underground coal or
other mine in the event of an emergency. The costs of making advance
arrangements for such teams shall be borne by the operator of each such
mine.

ulations were challenged but were upheld by the Third Circuit. The regulations provide education and training requirements for all of the coal mines, metal mines and other non-metal mines and apply not only to underground mines but to surface mines as well.


365 The regulations are generally described by MSHA as follows:

. . .[O]perators of coal and other mines are required to train miners according to a health and safety training program approved by the Mine Safety and Health Administration (MSHA). Operators submit the training program for approval to the MSHA Training Center Chief. Operators must have training programs for the training of new miners, the training of newly employed experienced miners, the training of miners assigned to new tasks, and the annual refresher training of miners. The requirements specify deadlines for submittal, approval and commencement of training programs. Operators must also extend to miners' representatives the opportunity to comment on proposed training programs prior to submittal for approval.

Operators are not required to regularly submit training programs for approval except that certain information regarding refresher training is to be submitted annually. Once approved, all training programs will be subject to monitoring and evaluation by the MSHA Office of Education and Training, which may require changes or additions in the programs in order that approval be retained.

Operators and miners' representatives are afforded an opportunity to engage in informal consultation with the Training Center Chiefs concerning any needed revisions specified by the Training Center Chiefs in order to obtain or retain program approval. Moreover, operators, miners, and miners' representatives may appeal the Training Center Chief's decisions affecting the training program to MSHA's Director of Education and Training. In addition, the Training Center Chiefs and the Director must state in writing to the operator any reasons for changes or for disapproval of programs or proposed notifications, advise corrective action and specify a time for compliance.

To the greatest extent possible, . . . the proposed rule specifies the courses which must be included in the training programs. All courses except new task training must be taught by instructors approved by MSHA, such approval to be revoked only for good cause. To assist the operator, particularly small operators and operators with limited resources and facilities, operators may participate in MSHA conducted or approved cooperative training programs.

New Entrants

The law requires forty hours minimum training for new entrants of the underground mining vocation,\(^6\) of which eight must be completed before the miner goes into the mine. The training must cover several topics specified in the regulations.\(^6\) For surface miners, a minimum of twenty-four hours is required, eight of which must be completed before the miner begins his work at the minesite. The specific topics of instruction for new entrants in the surface mining industry are similarly specified by regulation.\(^7\)


\(^7\) The 40 hours of underground training must include instruction in the following areas:
- The statutory rights of miners and their representatives under the Act
- Authority of supervisors
- Responsibility of supervisors
- Self-rescue and respiratory devices
- Respiratory devices
- Entering and leaving the mine (e.g., check-in, check-out system)
- Transportation of miners and materials in the mine
- Communications
- Introduction to the work environment
- Mine maps
- Escapeways
- Emergency evacuation
- Barricading
- Roof or ground control plans
- Ventilation plans
- Health
- Clean up
- Rock dusting
- Hazard recognition (generally)
- Electrical hazard recognition and avoidance
- First aid
- Mine gases
- Health and safety aspects of the tasks to which the new miner will be assigned
- Other courses that the government requires

See 30 C.F.R. § 48.5(b) (1979).

\(^6\) The 24 hours of surface mine training must include instruction in the following areas:
- Instruction in the statutory rights of miners and their representatives
- Authority of supervisors
- Responsibility of supervisors
- Self-rescue
The regulations expressly require that the mine operator provide training in the many statutory rights of miners. 288

- Respiratory devices
- Transportation controls
- Communication systems
- Introduction to the work environment
- Escape
- Emergency evacuation plans
- Firewarning signals
- Fire fighting procedures
- Ground control
- Working in areas of highwalls
- Water hazards
- Pits and spoil banks
- Illumination
- Night work
- Health
- Hazard recognition
- Electrical hazards
- First aid
- Explosives
- Health and safety aspects of the tasks to which the new miner will be assigned
- Other courses that the government requires

30 C.F.R. § 48.25(b) (1979).


- Right to "Representatives of Miners" for safety and health purposes (passim, implemented at 30 C.F.R. §§ 40.1 to 40.5 (1979)).
- Right to protection from discrimination for exercising statutory rights (30 U.S.C. § 815(c)).
- Right to exercise rights on behalf of others' safety and health (30 U.S.C. § 815(c)).
- Right to refuse to work under conditions or practices believed to be unsafe, unhealthy, or illegal (30 U.S.C. § 815(c)).
- Right to report a suspected violation or danger to the operator, representative, or MSHA (30 U.S.C. § 815(c)).
- Right to institute and to testify in proceedings without interference or retaliation (30 U.S.C. § 815(c)).
- Right to request a special MSHA inspection of suspected violations and imminent danger (30 U.S.C. § 813(g)).
- Right to notify a MSHA inspector on the mine premises of suspected violations and imminent danger (30 U.S.C. § 813(g)).
- Right to informal review of MSHA failure to conduct inspections or issue citations for reported violations and imminent dangers (30 U.S.C. § 813(g)).
Refresher Training

Annual refresher training of eight hours in health and safety for experienced miners is required. The regulations again specify the topics to be covered.

- Right to accompany MSHA inspector during inspection without loss of pay ("walk-around" rights) (30 U.S.C. § 813(f)).
- Right to participate in pre- and post-inspection conference (30 U.S.C. § 813(f)).
- Right to compensation when idled by federal citations or when required by an operator to work in violation of federal citations (30 U.S.C. § 821).
- Right to participate in the development and implementation of mandatory training programs (30 U.S.C. § 825).
- Right to a copy of one's training certificate (30 U.S.C. § 825).
- Right to withdrawal by MSHA if untrained without loss of pay or other benefits (30 U.S.C. § 814(g)).
- Right to participate in the development of roof control, ventilation, and dust control plans (30 U.S.C. § 811).
- Right to sanitary bathing and toilet facilities, to a self-rescuer, and to potable drinking water (30 U.S.C. § 877(1), (n), (s)).
- Right to respiratory devices (30 U.S.C. § 842(h)).
- Right to free black lung examinations and tests (30 U.S.C. § 843).
- Right to warnings, medical examinations, and transfer under new or modified safety and health standards (30 U.S.C. § 811(a)(6), (7)).
- Right to federal health and safety evaluations of mine conditions and practices (30 U.S.C. § 951).
- Rights to be informed and rights of access to information (30 U.S.C. §§ 811(a)(7), 811(c), 813(c), 813(d), 813(b), 815(a), 815(b), 815(d), 817(b), 819, 862(a), 863(d), 863(f), 863(g), 863(2), 865(e), 872(b)).
- Rights to participate in formal administrative and judicial proceedings (30 U.S.C. § 811(a)-(d), 815(b)-(d), 817(b), 816, 821).

An experienced miner is a miner who has received training acceptable to MSHA from an appropriate state agency within the preceding 12 months; or has received new miner training within the preceding 12 months for underground or surface mining (whichever the miner's new job includes); or has at least 12 months experience over the past three years in underground or surface mining (whichever the miner's new job includes). 30 C.F.R. § 48.2(b) (1979) (underground mine); id. § 48.22(b) (surface mine). If the annual refresher training is given in segments over the period, no individual session may be shorter than 30 minutes. 30 C.F.R. § 48.8(d) (1979).

The following topics are addressed in the refresher training course for un-
Experienced Miner Switching Jobs

Training is required before even experienced miners begin work at a different mine. The reason for this is to acquaint the

derground miners:
- Mandatory health and safety standards
- Transportation controls
- Communication systems
- Barricading
- Roof or ground control plans
- Ventilation plans
- First aid
- Electrical hazards
- Prevention of accidents
- Self-rescue devices and other respiratory devices
- Explosives
- Mine gases
- Health (measurements and protection plans governing dust, noise, etc.)
- Any other courses that MSHA requires, based on circumstances or conditions existing at the particular mine


For surface miners, the following topics comprise the course:
- Mandatory health and safety standards
- Transportation controls
- Communication systems
- Escape and emergency evacuation plans
- Firewarning signals
- Firefighting procedures
- Ground control
- Highwalls
- Water hazards
- Pits
- Spoil banks
- Illumination
- Night work
- First aid
- Electrical hazards
- Prevention of accidents
- Self-rescue devices and other respiratory devices
- Explosives
- Mine gases
- Health (measurements and protection plans governing health, noise, etc.)
- Any other courses that MSHA requires, based on circumstances and conditions existing at the particular mine

miner with safety and health problems that are not necessarily similar in his new workplace.  

New Task Training

Miners assigned to certain new work tasks are required to be trained in the safety and health aspects of the task under supervised practice or operation in a practical setting and, with limited exception, may not perform such tasks without having received the training.

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271 Experienced underground miners starting employment at a new and different mine are required to be trained for an unspecified period of time in the following topics:
- Introduction to the work environment
- Mandatory health and safety standards
- Authority and responsibility of supervisors and miners' safety representatives
- Entering and leaving the mine
- Transportation
- Communications
- Mine maps
- Escapeways and emergency evacuation
- Barricading
- Roof or ground control plans
- Ventilation plans
- Hazard recognition
- Any other courses which MSHA requires, based on circumstances or conditions existing at the particular mine.

30 C.F.R. § 48.6(b) (1979).

The comparable surface miner receives training in the following topics:
- Introduction to the work environment
- Mandatory health and safety standards
- Authority and responsibility of supervisors and miners' safety representatives
- Transportation controls
- Communications
- Escape and emergency evacuation plans
- Firewarning signals and firefighting procedures
- Ground control
- Highwalls, water hazards, pits, and spoil banks
- Illumination and night work
- Hazard recognition
- Any other courses which MSHA requires, based on circumstances or conditions existing at the particular mine.


272 30 C.F.R. § 48.27(a) (1979). The new tasks to which the rule is applicable
Miners assigned other new tasks must be instructed in safety and health procedures before performing the task. The law does not require the new task training to be of any minimum duration, although it must be sufficient to allow the trainee to demonstrate his ability to safely perform the job.273

Training Plans

Each mine company must develop a training plan which specifies exactly how and when that mine will meet the law's training requirements.274 Mines cannot operate without MSHA's prior approval of such a plan. The plans must cover all the safety and health problems at the particular mine, even if that means going beyond the minimum provisions of the regulations.274

Untrained Miners

If a miner is working but has never been trained, or has not been trained according to the requirements of the law, MSHA must then order the miner to be withdrawn from the mine and order the company to train the miner, with pay.275

Supervisory Training And Certification

For a number of years most mining states have variously determined the qualifications and controlled the certification of mine foremen and other supervisors. Unfortunately, these programs do not consistently cover all levels of supervision276 and have been notoriously inadequate in meeting the needs of the in-
Because of their limited scope and random applicability, state programs certifying foremen and preshift examiners or fire bosses do not provide the necessary training and testing to ensure well-trained, competent managers or supervisors at any level, and ironically exhibit a particular weakness with respect to the highest levels.

Congress had apparently responded to this shortcoming as early as 1969 by mandating federal certification qualification and registration programs as well as a training program for all miners. In various sections throughout the 1969 Act and the 1977 Amendments, reference is made to "certified" and "qualified" personnel. However, no substantive regulations have been promulgated regarding federal certification, qualification, or training of supervisors.

In 1974, informally proposed regulations for such certification, qualification, and training were released and public meetings

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278 The terms are defined in Federal Mine Safety and Health Act of 1977 § 318(a), (b), 30 U.S.C. § 878(a), (b) (1976), as follows:
For the purpose of this title and title II of this Act, the term—
(a) “certified” or “registered” as applied to any person means a person certified or registered by the State in which the coal mine is located to perform duties prescribed by such titles, except that, in a State where no program of certification or registration is provided or where the program does not meet at least minimum Federal standards established by the Secretary, such certification or registration shall be by the Secretary;
(b) “qualified person” means, as the context requires,
(1) an individual deemed qualified by the Secretary and designated by the operator to make tests and examinations required by this Act; and
(2) an individual deemed, in accordance with minimum requirements to be established by the Secretary, qualified by training, education, and experience, to perform electrical work, to maintain electrical equipment, and to conduct examinations and tests of all electrical equipment;
279 The regulations do provide a procedure for temporary certification, incorporating state certification schemes and operator form filings where no certification exists.
were held in six cities across the country.

An Assistant Administrator for the Mining Enforcement and Safety Administration set out the jurisdiction and method of public comments by which the proposed regulations were to be considered.

Herschel Potter, the Chief of the Division of Safety, Coal Mine Health and Safety, and co-chairman of the sessions, set forth MESA’s position and the rationale requiring these regulations by stating in part:

Persons who supervise miners up to and including the superintendent level will be required to be certified at both surface and underground coal mines.

... The quality of supervision a miner receives on the job plays an important role in safe work practices. Consequently, we must initiate methods which will assure that miners are receiving top-quality supervision.

... The proposed Regulations would require persons who supervise miners, both underground and on the surface, to pass an

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280 The Mining Enforcement and Safety Administration (MESA), an agency within the Department of the Interior, was the predecessor to MSHA, the agency within the Department of Labor which assumed responsibility for mine safety and health matters under the 1977 Amendments.

281 In accordance with the requirements of Subparagraphs (a) and (b) of §318 of the Federal Coal Mine Health and Safety Act of 1969, the Mining Enforcement and Safety Administration plans to propose and promulgate mandatory Regulations which will set forth minimum Federal standards for the certification and qualification of miners.

In addition, MESA plans to amend §317(1) of the Act to require mandatory training of all miners.

This Public Meeting is being held under the provisions of Subparagraphs (c) §101 of Public Law 91-173 for the purpose of discussing a draft of proposed Regulations that will require mandatory training qualification, and certification of miners employed in and around surface and underground coal mines.

The proposed Regulations with whatever changes are made as a result of these meetings, will be published in the Federal Register under the rule making authority granted the Secretary of the Interior under the provisions of §101 of the Act, and more specifically, §101(a).

MESA, U.S. Dep't of the Interior, Transcript of Public Meeting on Proposed Regulations for Certification, Qualification, and Training, at 1-2 (July 11, 1974) (Pittsburgh, Pa.).
A COMPARATIVE STUDY

examination for certification.

At present most mining state laws require that only mine foreman or mine managers and the preshift examiners or fire bosses be certified officials. MESA is proposing that all levels of supervision from the section foreman to the superintendent should be required to be certified, that is, any person charged with the responsibility for supervising other miners up to and including superintendents should be certified.

In the use of the word “miner” we are defining it the same as contained in the Federal Coal Mine Health and Safety Act. That definition includes both Labor and Management personnel employed in and around the coal mine.

In most coal mining states, the mine foreman is certified and is held responsible by the state for complying with the mine laws of the state in which he is employed. The employment of the superintendent or an assistant superintendent makes the mine foreman subordinate to a level of management which is responsible only to the mine operator or the mine owner. We believe that in order to provide a safe working environment for all miners, persons holding positions of superintendents and assistant superintendents as well as other positions of mine management should be certified.

The same foregoing reasons apply to the management of surface coal mines. However, the problem at surface coal mines is more serious in that very few mining states, if any, now require certification of any surface mine official.

The industry reacted strongly against the proposed Federal program of certification and qualification. Mr. Robert Vines, Vice President for Health and Safety of the Bituminous Coal Operators Association (BCOA), submitted that group’s position at every public meeting throughout the country. In a statement made in the form of comments directed at such provisions, he stated, “we suggest that these subparts each be deleted in their entirety.” By way of explanation, he continued, “B.C.O.A. continues to take the position that there is no need for a Federal program for certification and qualification of coal mine personnel other than those persons who are required by statute to be certified or qualified to perform certain duties.” BCOA further contended that Con-

282 Id. at 3, 4, 5, 6 (emphasis added).
283 Id. at 21.
284 Id.
gress had not intended to regulate the supervisory force and that such regulations would somehow interfere with the collective bargaining of the industry. 

Individual companies also expressed their opposition, in predrafted form testimony, to any federal supervisory certification and qualification training scheme, as did the National Association of State Mine Inspection Agencies. The latter group presented at each public meeting a resolution opposing any federal certification on the grounds that the principle of state rights would be violated by such federal action, but in the event that Federal action was nonetheless forthcoming, they should have the right to assist in the establishment of the federal guidelines.

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To shift the certification and qualification emphasis from a requirement and responsibility to perform certain duties to a specific delineation of the classifications and occupational categories who will perform such duties would, in the opinion of B.C.O.A. be contrary to the intent of the Congress, unworkable in practice, conducive to the most disruptive labor-management situations and incompatible with an operator's right to organize and manage a mine for optimum results.

\[Id.\] at 21, 22.

See, e.g., MESA, U.S. Dep't of the Interior, Transcript of Public Meeting on Proposed Regulations for Certification, Qualification, and Training (July 9, 1974) (Evansville, Ind.).

NATIONAL ASSOCIATION OF STATE MINE INSPECTION AGENCIES SPRINGFIELD, ILLINOIS JUNE 16, 1974

RESOLUTION

WHEREAS, the Mining Enforcement and Safety Administration of the United States Department of the Interior has advertised proposed regulations under Subpart B — Certified and Qualified Persons of Part 75 — Underground Coal Mines, which would require that States having certification programs of certain mine personnel be required to meet the approval of the Secretary of the Interior and

WHEREAS, States have had many years experience in developing criteria for training, examinations, and certifications, in most cases with requirements exceeding those for federal mine inspection personnel and

WHEREAS, Congress has recognized States' rights in certification programs as set forth in the Federal Coal Mine Health and Safety Act of 1969 and

WHEREAS, dual certification efforts could result unless certification, with financial assistance from the Federal Government, be vested in States and

WHEREAS, States are strongly in favor of training and education of the nation's coal industry employees.
Following these public hearings, MESA decided against further pursuing the certification and qualification scheme, and instead split the proposed regulations into proposed training regulations for miners and a temporary certification and qualification regulation which simply allowed state certification (where it existed, and in whatever form) to be adequate for fulfilling the requirement of the Act. Where the state certification or qualification requirements are nonexistent, or inapplicable to particular regulatory requirements, each mine operator must simply file an application for a six month temporary certification (which is renewable) based upon his statement that the supervisor has a certain amount of experience. These temporary certifications, since that time, have been granted pro forma. In sum, after eleven years of the enactment of a federal law which created the authority to ensure the competence of American mine management, the extent of MSHA's regulatory certification over such personnel consists of these perfunctory 6-month permissions. There continues to be no meaningful federal requirements for the qualification or certification of supervisors.

As indicated above, several states have had foreman certification programs for some time. These programs have been too limited in scope and inadequate in application, according to MESA's position as expressed in the public statements preceding the public meetings on the proposed certification scheme. Even on its

THEREFORE, be it resolved, that no further inroads be made into States' rights and responsibilities but that States should be provided with the opportunity to assist in establishing criteria and guidelines for training and certifying personnel above and beyond those already certified by States:

H. Kirkpatrick
Vice-Chairman — Coal
Kentucky Department
of
Mines and Minerals

Id.

30 C.F.R. § 75.100 (1979) (underground); id. § 77.100 (surface).
Temporary Health and Safety Activity Certification for Underground Mining, U.S. Department of Labor, Qualification and Certification Form, No. 5000.4 (for surface mines) or No. 5000.5 (for underground mines).
Such temporary certifications continue to be granted. Telephone interview with John English, Director of Education and Training, MSHA, May 12, 1980.
MESA, U.S. Dep't of the Interior, MESA Position on Proposed Regula-
face, the state certification program is inadequate. A review of eight of the largest coal producing states show that the state requirements for certification do not comport with the realities of the industry. For example, none of the eight largest coal-producing states required any certification of mine superintendents beyond that of foreman’s papers. Moreover, some states, for example, West Virginia and Illinois, do not even require that the superintendent have foreman certification. Thus, the absurd condition can and does exist in which a mine superintendent has no state or federal certification whatsoever. Compared with the managerial hierarchies of the foreign mines reviewed in the foregoing portions of this article, all of which require a qualification of competence in accordance with the responsibilities of the position, the shortcomings of the American system are apparent.

292 See chart at page 1013 infra.
<table>
<thead>
<tr>
<th>STATE LAW</th>
<th>PRIOR TO UNDERGROUND WORK</th>
<th>SHIP PROGRAM</th>
<th>FICATION: TITLE REQUIREMENTS**</th>
<th>RETRAINING</th>
<th>LEVELS OF CERTIFICATION: MINER EXAMINER, ASSISTANT FORMAN REQUIREMENTS</th>
<th>RETRAINING</th>
<th>EQUIVALENT LEVELS REQUIREMENTS</th>
<th>OR EQUIVALENT LEVEL REQUIREMENTS</th>
<th>CERTIFICATIONS &amp; REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colo.</td>
<td>CRS 1973</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>&quot;Shotficer,&quot; &quot;Examiner,&quot; min. age 23, U.S. Citizen, 1st Aid, hearing, eyesight, 3 yrs. exp.</td>
<td>&quot;Foreman&quot; same as &quot;Examiner&quot;</td>
<td>No certification necessary</td>
<td>No</td>
<td>Electrician: 1 yr. exp., shotficer or lamp &amp; gas cert., MSHA or state electrical card, exam or retraining</td>
</tr>
<tr>
<td>Ill.</td>
<td>Ill. Statutes, Ch. 96.5, articles 5-7.</td>
<td>None</td>
<td>None</td>
<td>&quot;1st Class Certification&quot; demonstrate: 1 y. face exp. (degree = 6 mos.) 1st aid and mine rescue card no exam</td>
<td>&quot;Mine Examiner&quot; 4 yrs. exp., 1st class cert. 2 yr. degree = 1 yr., 4-yr. degree = 2 yrs. min. age 21, class optional writ. &amp; oral. ex.</td>
<td>None</td>
<td>No certification necessary</td>
<td>No</td>
<td>Electrician: 2 yrs. exp., 30-hr. hoisting under certified engineer, state-req. welder's exam and performance test</td>
</tr>
<tr>
<td>Ind.</td>
<td>Ind. Code 22-10-3-10 22-10-3-13</td>
<td>Apply for temp. permit, no requirement</td>
<td>6 mos. work w/ supervision</td>
<td>&quot;Miner&quot; apprenticeship</td>
<td>&quot;Fireboss&quot; 3 yrs. exp., eng. degree = 1 yr. exp., writ. &amp; oral exam, possible practical exam</td>
<td>&quot;Foreman&quot; 5 yrs. exp. same exam as &quot;Assist. Foreman&quot;</td>
<td>Requires Foreman certification</td>
<td>Note</td>
<td>Shotficer—course in explosives, 1 yr. exp., exam</td>
</tr>
<tr>
<td>Ky.</td>
<td>KRS 331, 352 reg.: 005 KAR 7:010-010</td>
<td>48-hr. course</td>
<td>90 days exp.</td>
<td>&quot;Miner&quot; (temp. permit good 1 yr. only) 90 days exp., exam</td>
<td>&quot;Assistant Foreman&quot; class optional, 3 yrs. exp., writ. &amp; oral exam covers: mining law, 1st aid, ventilation, explosives, elec., gases, maps, gas testing</td>
<td>Requires Foreman certification</td>
<td>Requires Foreman certification</td>
<td>Note</td>
<td>Surface Supervisory Position: 2 yrs. exp.</td>
</tr>
<tr>
<td>Ohio</td>
<td>Ohio Mining Law §415117</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>&quot;Surface Foreman&quot; &quot;Underground Foreman&quot; min. age 23, 1 yr. exp., cig. can count up to 1 yr. Deep: 2-day test also covers safety equipment. &quot;Gen. Mine Foreman,&quot; min. age 23, 5 yrs. exp., 3-day exam</td>
<td>Requires Foreman certification</td>
<td>Requires Foreman certification</td>
<td>Requires Foreman certification</td>
<td>Electrician, Fitter, etc. 1 yr. exp., 1-exam, 1-day exam</td>
</tr>
<tr>
<td>Penna.</td>
<td>Anthracite: Act 346 Bituminous: Act 339</td>
<td>None</td>
<td>None</td>
<td>Miners: 1-yr. supervision of certified miner (apprentices, 2 yrs.)</td>
<td>&quot;Miner&quot; apprenticeship, 2-day exam</td>
<td>&quot;Foreman,&quot; 5 yrs. exp., up to 2 yrs. credit for college, 3-day exam</td>
<td>Requires Foreman certification</td>
<td>Requires Foreman certification</td>
<td>Requires Foreman certification</td>
</tr>
<tr>
<td>W.Va.</td>
<td>W.V. Code §22-3-1 et. seq. §72-6-1 et. seq.</td>
<td>Reqd.: 80-hr. program, final exam</td>
<td>6 mos. work underground, close supervision</td>
<td>&quot;Certified Miner&quot; must complete apprenticeship, pass exam</td>
<td>&quot;Assistant Foreman&quot; &quot;Fireboss&quot; 3 yrs. exp., at least 18 at face—cred. for educ: assoc. degree = 1 yr., bacc. = 2 yrs., Exam. M. Foreman—same as assst. + 2 add’l yrs. exp.</td>
<td>&quot;Mine Foreman,&quot; 5 yrs. exp., 18 months at fmr., credit same, Exam.</td>
<td>No certification necessary</td>
<td>No</td>
<td>Electrician: 1 yr. exp., Exam. Shotficer: 2 yrs. exp., Exam.</td>
</tr>
<tr>
<td>Wyo.</td>
<td>&quot;Coal Mining Laws of the State of Wyo.&quot;</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>&quot;Mine Examiner&quot; min. age 23, 2 yrs. exp., at least 1 yr. in Wyo, 1-day oral &amp; writ. exam</td>
<td>&quot;Foreman&quot; min. age: 23, 3 yrs. exp., at least 1 yr. in Wyo., U.S. Citizen, Examiners certification, 1-day oral &amp; oral exam</td>
<td>No certification necessary</td>
<td>No</td>
<td>Shotficer: Under-ground: 2 yrs. exp., at face, 1 yr. in Wyo. Surface: 1 yr. exp. w/ explosives, 1-day oral &amp; written exam</td>
</tr>
</tbody>
</table>

*In Illinois, one must receive certification at one level before being tested at the next.

**All requirements listed are extensions of or additions to federal regulations.

***Experience usually must be in a similar type of work at the same type of mine.

****Most states without this category require the superintendent to have a foreman's certificate.
CONCLUSION

Although meaningful comparisons between systems of training and certification for coal miners in various countries are not easily drawn, several facts are clear. Coal mining is the most dangerous occupation in all industrialized nations. Hundreds of coal miners are killed, and thousands injured, every year. And yet, in spite of the inherent hazards that exist in only nominal variation throughout the world, a miner is notably safer in the countries of Great Britain or West Germany. A logical explanation for this divergence is that the training and supervisory certification requirements in the United States are less thorough than those of any other nation studied. Comparisons should not be made defensively in mine health and safety matters. Lives are at stake in the mines all over the world, regardless of the political system under which the country operates. Ideologies give way underground to the dangerous and difficult job of removing coal in a safe and healthful manner.

The American system of training and certification does not compare well in several specific areas. The United States has the shortest required training period for new entrant underground miners of any country surveyed. Even taking into account the recently enacted federal regulations requiring forty hours, along with the most stringent state requirements (i.e., the State of West Virginia's requirement of eighty hours prior training and its red hat requirement), requirements of the United States pale in comparison with those of the other countries, especially the advanced programs of West Germany or England. The absence from the American system of training face requirements, controlled supervised periods before working alone, extended training refresher programs, and requirements controlling the movements of new miners all contribute to an overall training program which rejects proven experience and condemns miners as well as super-

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293 The federal training regulations in the United States have been in effect only since late in 1978. See 43 Fed. Reg. 47,459 (1979). From the authors' various discussions, it appears that most mine operators have at least devised a training plan in accordance with the regulations. Although it is too early to determine the practical impact of the federal requirements, the fact that a uniform system has been mandated should imply that at least some training is being accomplished nationwide.

294 See W. VA. CODE §§ 22-6-3, 22-6-5 (1978 Replacement Vol.).
visors to injuries and even deaths which are avoidable, unnecessary, and have been eliminated in other mining countries.

The new-task training requirements in the United States are likewise the least stringent in terms of hours and topics covered. While no comparison was made in this article between specific jobs such as electrician, mechanic, etc., the American program of skill training is weaker than nearly any other country reviewed. It is indeed a tribute to the miners, foremen and heavenly forces that more miners are not killed or injured.

An effective training system for all supervisory personnel is nonexistent in this country because no substantive federal requirement for certification exist. Individual states typically only require training and certification for foremen, who occupy the positions with legal responsibility for health and safety matters in nearly all states. However, although foremen are subordinate to superintendents and assistant superintendents, no state provides certification requirements for these higher managerial positions. Those managers are responsible only to the mine owner or operator.

Thus, a mine superintendent with responsibility for the lives of over a thousand men and women may only have completed a foreman training program and passed the foreman examination twenty-five years earlier and may have never returned to the classroom or training center to update his skills or adapt his abilities to new conditions. Even more troubling is the fact that in some coal producing states, including two of the largest, West Virginia and Illinois, the person ultimately in charge of the mine is not required by state law or federal law to possess even as much as a miner's certificate or foreman's certificate.

The failure of the federal government's Department of Labor to require certification and qualification for the higher levels of mine supervisors is unconscionable, especially when reviewed in light of the lack of certification requirements in the major and minor coal-producing states reviewed.

The fact that inadequate state programs continue to be the norm does not speak well of the mining industry or the government's enforcement agencies charged with regulating that industry. In some countries, notably West Germany, the industry by self-imposed regulation and strong governmental encouragement
has developed extensive training programs and requirements for new miners and skilled miners. They have also developed sophisticated and successful supervisory training programs and a systematic procedure for certifying supervisory competency. Other countries operating under nationalization, notably the United Kingdom, have developed extensive training for all classes of miners and supervisory individuals, the end result of which is the enhanced safety of the miner. Finally, under the centralized governmental systems of Poland or Romania, the training of miners is more comprehensive and the certification of supervisors more complete and thorough than under programs in the United States.

The American mining industry, if it is to meet the country's energy needs without subjecting countless mining men and women to the risk of incompetent direction, and if it is to learn from the mining countries of Western and Eastern Europe, should adequately train and educate its work force, both miners and supervisors. In addition, the federal government should respond to the need for a uniform, substantive, and professional program for the certification of those who control the nation's coal mines.