Readings in Mining English

矿业英语注释读物

煤炭加工利用

龚琪玫 编

煤炭工业出版社

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内 容 提 要

本书大部分文章选自美英两国八十年代出版的书刊，杂志，共24篇。内容新颖，涉及选煤方法、选煤设备及工作原理、气化、液化和选煤经济。

本书还体现了近代英语的特点。注释部分有大量例句，书后附有参考译文和单词汇总。

本书可供具有一定英语基础的有关工程技术人员、大专院校师生和研究生学习专业英语之用。

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前　言

本书是煤加工利用类英语注释读物。编写的目的是帮助具有一定英语基础的读者提高阅读专业英语文献的能力。为了反映当代英语的特点，大部分材料选自八十年代出版的原版书刊。注释部分包括科技英语中常见的语言现象、构词法和词的用法，并有大量例句，帮助理解原文，和进一步提高英语水平。书后附有总词汇表。总词汇表包括普通词汇及词组、专业词汇及词组、缩写词和地名，为便于查阅，全部按字母顺序编排。书后并附有参考译文，译文力求通顺并尽量保持原文结构，便于对照。

本书特约中国矿业学院北京研究生部选矿研究室作技术顾问。在编写过程中北京矿业学院附属中学支毓钧老师在译文等方面作了许多修改。对此，编者表示衷心的感谢。

由于编者水平所限，缺点错误在所难免，欢迎读者批评指正。

编　者

1985年2月

目　录

CONTENTS

COAL PROCESSING

1. The Outline of Coal Preparation

Coal preparation, simply put①, is the conversion of run-of-mine (ROM)② coal (or③ coal as it leaves the mine complete with impurities and prior to any processing) into a marketable product. (A quality-controlled substance whose composition meets the ever-increasing specifications required for its use whether it's combustion, liquefaction, gasification or carbonization.)④

The coal we mine today⑤ represents the deposition of phytogenic material 50 to 350 million years ago. The resulting horizontal strata, what we call coal seams, will vary in thickness from several inches to several hundred feet. They are usually separated by varying thicknesses of sedimentary rocks such as shales, clays, sandstones and, sometimes, even limestone, OR——when combined with coal——what are known as impurities in terms of preparation⑥.

Originally, coal preparation began as a line of equipment——crushers, feeders, screens, etc.——to control the size of the mined coal. Among the product line was the conveying picking table which was used to visually inspect the

ROM coal so that obvious impurities could be removed manually. Thousands of men, women and children performed this unfulfilling work until mechanization replaced① it withmore modern coal cleaning equipment.

Generally speaking, this coal cleaning equipment was developed for British and European mines because their coal was of② much greater value per ton than in the U.S. Its value reflected its cost of mining——which was high——because the seams were more difficult to mine compared with American coal seams.

However, although U.S. seams are among the easiest in the world to mine, preparation took on a new significance with the unionization of mines during the New Deal. A rapidly rising demand for machines to mine coal both underground and above ground was created; machines which were not and are not selective and which mine whole seams, including partings and some roof and floor materials.

Mechanical mining meant mechanical cleaning.

Perhaps the easiest way to understand the evolution of coal cleaning and to understand the variations found within the industry is to become familiar with the levels of coal preparation.

Each level is indicative③ of the intensity of the work performed on run-of-mine coal and each is an extension of the previous level.

Level 0 processing is the mining and shipping of ROM coal.

Level 1 processing combines top-size control by crushing, with⑩ some removal of undesirable constituents such as tramp iron, timber and perhaps strong rocks. The product of Level 1 processing is commonly termed raw coal.

Level 2 processing involves the cleaning of the coarser sizes of raw coal (or coal which is larger than 1/2″). The coal finer than 1/2″ would be added to the cleaned coarse coal or sent elsewhere.

Level 3 processing extends the cleaning of the raw coal to the intermediate size raw coal——1/2″ by⑪ 1/2mm. The minus 1/2mm material is added to the cleaned coal (the plus 1/2mm coal) or sent elsewhere.

Level 4 processing extends the cleaning to include the minus 1/2mm raw coal.

Developing the appropriate circuitry for processing raw coals at Levels 2,3 and 4 involves four areas—— characterization, liberation, separation and disposition.

Characterization is the systematic examination of the ROM coal in order to determine the make up⑫ of the feed to the coal preparation plant. A coal processing engineer will develop a flowsheet of the unit operations required to achieve the desired preparation level.

Liberation is the creation of individual particles whose composition are predominantly coal or refuse. This is

achieved by size reduction or the crushing of the just-mined[13] coal to a particular top size as[14] determined by the characterization study. The feed to the coal preparation plant is then raw coal from Level 1 processing. Unfortunately, particles containing both coal and refuse——known as middlings——are also created.

Separation is, simply, the dividing of the particles into their appropriate groups——coal, refuse and middlings. Coal's impurities are numerous, but by far the largest have specific weights greater than coal. The dominant method for separating the liberated coal is by gravity concentration which relies on two physical property differences——size and specific gravity. The raw coal is thus characterized by partitioning the very heterogeneous coal into relatively homogeneous subpopulations[15] on the basis of size and specific gravity.

Disposition is the cleaning up of the various streams. The separation unit operations normally process water/raw coal slurries[16], thus the term "Coal Washing." The predominant disposition operation is the dewatering (separating the liquid and the solid) of the various streams after the separations have been made. The second most important disposition operation is refuse disposal, followed by other environmental control operations.

Coal preparation is the quality control arm of the coal industry. It is an integral part of the coal business.

注　　释

1. simply put "简单说来"，在句中作插入语。
2. ROM 是 run-of-mine 或 run-of-mine coal 的缩写。
3. or 在这里表示"即"，引出同位语。本句中的同位语从 coal 起一直到 any processing 止，其中包含一个时间状语从句"as……any processing"。
4. 括号内是一个附加在句末的解释成分，并不是一个完整的句子，其中的核心为 a quality-controlled substance，带一个定语从句"whose composition ……for its use"和一个状语从句"whether……or carbonization"，此状语从句是从属于定语从句的。
5. we mine today 为限制性定语从句，修饰 coal，从句中省略关系代词 which (或 that)。只有当关系代词 which 或 that 在从句中作直接宾语时，才可以省略。如：

   The machine we use is simple in construction. 我们使用的机器结构简单。

   The report I received was written by a famous coal processing engineer. 我收到的报告是一位著名的选煤工程师写的。
6. "OR-when combined with coal——what are known as impurities in terms of preparation" 是说明 shales, clays, sandstones and, sometimes, even limestone的。"OR" 的用法见注 3，作者用大写字母以示强调。这个说明语的中心为 what……preparation，what 相当于 the thing (或 things) which，表示"……的（东西）"，翻译时要根据具体情况处理"东西"这两个词的含义。请注意下面句子的翻译。

   What has been said above is very important. 以上所说的（事情）是很重要的。

   This coal preparation plant is different from what it was before. 这个选煤厂和它原先样子不同了。
7. replace "代替" 的用法有两种：to replace A with B；to replace A by B，都表示"用B代替A"。

We shall soon replace coal with (by) gas. 我们不久将用煤气代替煤。

8. "be + of + 抽象名词" 用来表示主语的性质或种属，作"是…的"或"具有…"解，有时相当于"be + 由该抽象名词构成的形容词"。本句 was of much greater value 相当于 was much more valuable。类似的用法如：

The problem is of great importance. (相当于 …… is very important) 这个问题很重要。

These rocks are all of a kind. 这些岩石都是属于一类的。

9. indicative 可以和介词 of 连用。

10. with 在这里表示伴随情况，说明在破碎过程中要除去某些杂物。

11. "by" 通常用来表示各向尺寸，可翻译成符号"×"。

12. make up 在这里为名词，也可以写成 make-up，意思是"组成，成分"。

13. just-mined 为复合词，由副词 just "刚才" 和动词 mine "开采" 的过去分词构成。这类复合词仍保持组成该词各部分的原义。组成这类复合词的第一部分也可以是其它词类，例如：

air-conditioned	空调的 (air 为名词)
large-sized	大型的 (large 为形容词)
underburnt	未烧透的 (under 为介词)
water-fed	带给水的 (water 为名词)

14. as determined by the characterization study 作 top size的定语，翻译成"煤质研究所确定的粒度上限。as的基本含义是"象……那样的"。"as + 过去分词短语"作定语时，可以在其前后加逗号，也可以不加逗号。举例如下：

The just-described processes, as mentioned earlier, are still in their early stages. 如前面谈到过的，刚才描叙的方法仍处于初级阶段。

See the data as listed below. 请参阅下面所列举的数据。

15. subpopulation 由 population "群、组" 加前缀 sub- "再分，细分，亚，子" 构成。现代科技英语中经常出现词典上查不到的新词，可以根据构词规律判断其词义。

16. water/raw coal slurries 中的/表示"或"。

2. Washability

Washability studies are conducted primarily to determine how much① coal can be produced at a given specific gravity and at what separation difficulty and size.

The importance of the size analysis is perhaps more clear if you think of the cleaning process as removing impurities from individual pieces of coal, rather than② in terms of tons of coal.

As③ the individual pieces get smaller they become harder——and more costly④——to clean.

Generally, the testing procedures of a washability study begin by⑤ obtaining a representative sample of the material already reduced to a designated top size. Next, the sample is sized at several different screen apertures, with⑥ each fraction held separately for further evaluation. A typical size analysis for a feed material is shown in Table 1.

The table presents the percent of total weight, as well as an analysis of ash, sulfur content and Btu of each fraction, both individually and cumulatively.

Then the material of each size fraction undergoes a float-sink test in liquids of pre-selected, carefully controlled specific gravities, beginning with⑦ the lowest.

The float material from each specific gravity bath is then weighed and sink material is tested in the next heavier bath.

The procedure is repeated until the desired number of float-sink fractions have been obtained[9]. A typical float-and-sink result for the $1^1/_2'' \times {}^3/_4''$ fraction in Table 1 is given in Table 2.

Since wider ranges are treated commercially, composite results are usually made by properly combining the individual size fraction results. A typical composite result of the $1^1/_2'' \times 28$m material (Level 3 processing) in Table 1 is shown in Table 3.

Table 1 $1^1/_2'' \times 0$ Size Analysis

Size	Direct (Dry Basis)				Cumulative			
	% Wt.	% Ash	% Sul	Btu	%Wt.	% Ash	% Sul	Btu
$1^1/_2'' \times {}^3/_4''$	25.80	26.30	5.80	10350	25.80	26.30	5.80	10350
${}^3/_4'' \times {}^3/_8''$	25.30	26.38	4.28	10415	51.10	26.34	5.05	10382
${}^3/_8'' \times {}^1/_8''$	26.40	27.38	3.98	10228	77.50	26.69	4.68	10330
${}^1/_8'' \times 28$m	14.50	31.48	3.66	9600	92.00	27.45	4.52	10215
28m × 48m	3.00	39.99	3.65	8146	95.00	27.84	4.49	10149
48m × 100m	2.00	41.69	3.30	7849	97.00	28.13	4.47	10102
100m × 200m	1.10	45.96	3.25	7033	98.10	28.33	4.46	10067
200m × 0	1.90	48.33	3.02	6697	100.00	28.71	4.43	10003
	100.00	28.71	4.43	10003				

Table 2 $1^1/_2" \times {}^3/_4"$ Washability Data Which@ Equals 25.80% of Total $1^1/_2" \times 0$

Specific Gravity		Direct (Dry Basis)				Cumulative Float			
Sink	Float	% Wt.	% Ash	% Sul	Btu	% Wt.	% Ash	% Sul	Btu
	1.30	45.40	7.23	2.87	13276	45.40	7.23	2.87	13276
1.30	1.35	18.50	10.88	4.66	12639	63.90	8.29	3.39	13092
1.35	1.40	6.80	13.96	6.87	12037	70.70	8.83	3.72	12990
1.40	1.45	3.80	17.37	7.37	11519	74.50	9.27	3.91	12915
1.45	1.50	1.80	21.93	8.09	10850	76.30	9.57	4.01	12866
1.50	1.60	0.90	24.08	10.21	10473	77.20	9.74	4.08	12838
1.60	1.80	1.10	39.21	13.35	9514	78.30	10.02	4.21	12792
1.80	2.00	1.20	49.92	9.33	5628	79.50	10.63	4.29	12684
2.00		20.50 100.00	87.11 26.30	11.65 5.80	1302 10350	100.00	26.30	5.80	10350

Table 3 $1^1/_2'' \times 28m$ Composite Washability Data Which⑩ Equals 92.0% of Total $1^1/_2'' \times 0$

Specific Gravity		Direct (Dry Basis)				Cumulative Float				Cumulative Sink			
Sink	Float	% Wt.	% Ash	% Sul	Btu	% Wt.	% Ash	% Sul	Btu	% Wt.	% Ash	% Sul	Btu
	1.30	40.16	6.36	2.90	13445	40.16	6.36	2.90	13445	100.00	27.45	4.52	10215
1.30	1.35	15.91	10.24	3.99	12775	56.07	7.46	3.21	13255	59.84	41.61	5.61	8047
1.35	1.40	7.56	12.74	5.12	12326	63.63	8.09	3.44	13144	43.93	52.96	6.19	6335
1.40	1.45	5.64	15.98	5.67	11832	69.27	8.73	3.62	13038	36.37	61.33	6.42	5090
1.45	1.50	3.27	20.04	5.82	11220	72.54	9.24	3.72	12956	30.73	69.65	6.55	3852
1.50	1.60	2.36	25.51	6.40	10367	74.90	9.75	3.80	12874	27.46	75.56	6.64	2975
1.60	1.80	2.03	34.28	8.10	8846	76.93	10.40	3.92	12768	25.10	80.26	6.66	2280
1.80	2.00	1.91	49.72	6.84	6142	78.84	11.35	3.99	12607	23.07	84.31	6.54	1702
2.00		21.16	87.43	6.51	1301	100.00	27.45	4.52	10215	21.16	87.43	6.51	1301