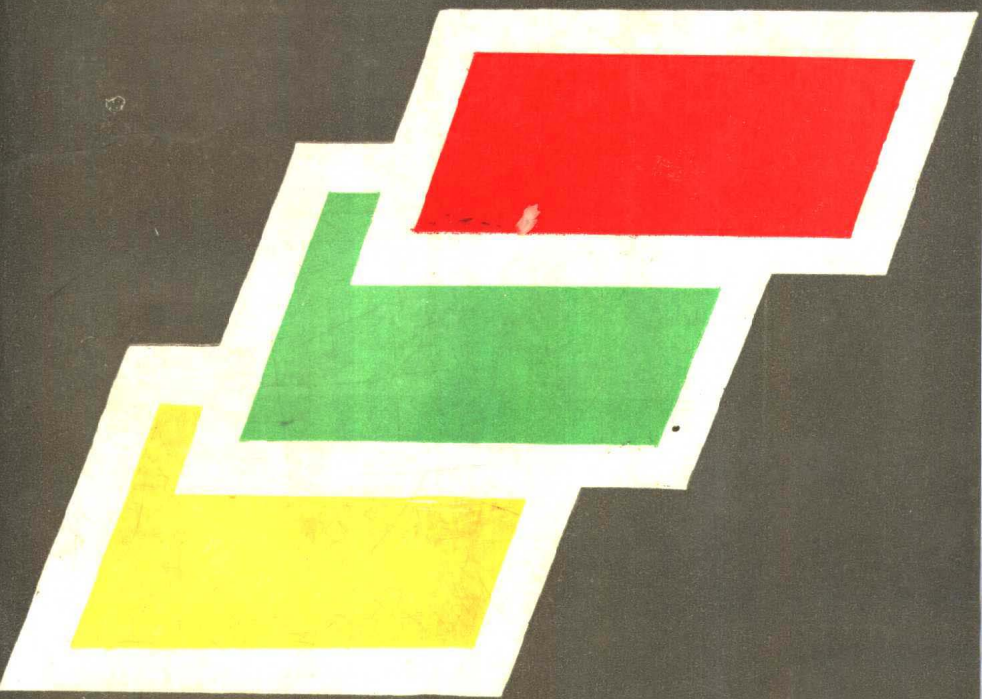
铸造专业英语文选

周世麟　董恒　合编



机械工业出版社

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序　言

为了迅速地了解当前技术发展动态，直接阅读原文很有必要。由于英语科技资料数量最多，内容最全。因此，掌握专业英语的阅读能力对工程技术人员来说非常重要。

学完基础英语的人开始接触英语科技资料时，往往感到困难。阅读速度慢、对原文理解不正确。这是因为缺少专业词汇以及对科技英语的语法特点不了解。编写本书的目的就是使具有基础英语知识的铸造工程技术人员提高专业英语的阅读能力。

本书选辑了45篇文章，每篇附有单词、语法注释和参考译文，约400多个铸造基本词汇。选择的内容比较全面，包括铸造工艺、造型材料、铸造合金、铸造设备以及特种铸造。这些文章选自英、美等国的不同书刊，其难易程度和写作风格各不相同，编者未加删减。书中的铸造名词术语是参照铸造学会编写的"铸造名词术语"翻译的。为使初学者学习方便，参考译文基本上采用直译，并注意每课课文在语法上具有一定的深度，对语法难点进行了较详细的分析，以有助于有一定基础英语知识的专业人员提高阅读与翻译有关专业英语书刊的能力。

本书可供铸造工程技术人员自学之用，也可作为大专院校铸造专业英语课的补充教材或课外阅读材料。

编者从事铸造专业英语教学的时间不长，水平不高，敬请读者指正。

编者　1986.8

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Lesson 1

Casting Processes

Steel castings are critical to every part of an industrial economy.

Figure 1–1 is a simplified flow diagram of the basic operations for producing a steel casting. There are variations from this flow sheet, depending on the type of steel cast, the complexity of the component shape, and the quality requirements established by the customer.[1]

The patterns are used for producing molds. Generally, sand is placed around the pattern and, in the case of clay-bonded sand, rammed to the desired hardness. In the case of chemical binders, the mold is chemically hardened after light manual or machine compaction. Molds are usually produced in two halves so that the pattern can be removed readily.[2] When these two halves are reassembled, a cavity remains inside the mold in the shape of the exterior of the pattern.

Internal passageways within a casting are formed by the use of cores. Cores are parts made of sand and binder which are sufficiently hard and strong to be

inserted in a mold.[3] Thus, the cores shape the interior of a casting which cannot be shaped by the pattern itself. The patternmaker supplies coreboxes for the production of precisely dimensioned cores. These core-boxes are filled with specially bonded core sand and compacted much like the mold itself. Cores may be hardened in the core box or subsequent to their removal from the box. Cores are placed in the drag, or bottom section, of the mold; then the mold is closed by placing the cope, or top section, over the drag. Mold closing completes the production of the mold into which the molten steel is poured.

The actual casting production begins with melting of steel (left-hand side of Figure 1-1). Molten steel is then tapped from the melting furnace into a ladle for pouring into the mold cavity where it is allowed to solidify within the space defined by the sand mold and cores.

After the casting has solidified, it is shaken out of the mold and the risers and gates are removed. Risers are shapes that are attached to the casting solely to provide a liquid metal reservoir. Metal in the risers is needed to compensate for shrinkage which occurs during cooling and solidification. Gates are the "channels" through which liquid metal flows into the mold cavity proper.[4] Most steel castings are then given an initial heat treatment to remove stresses and make the castings

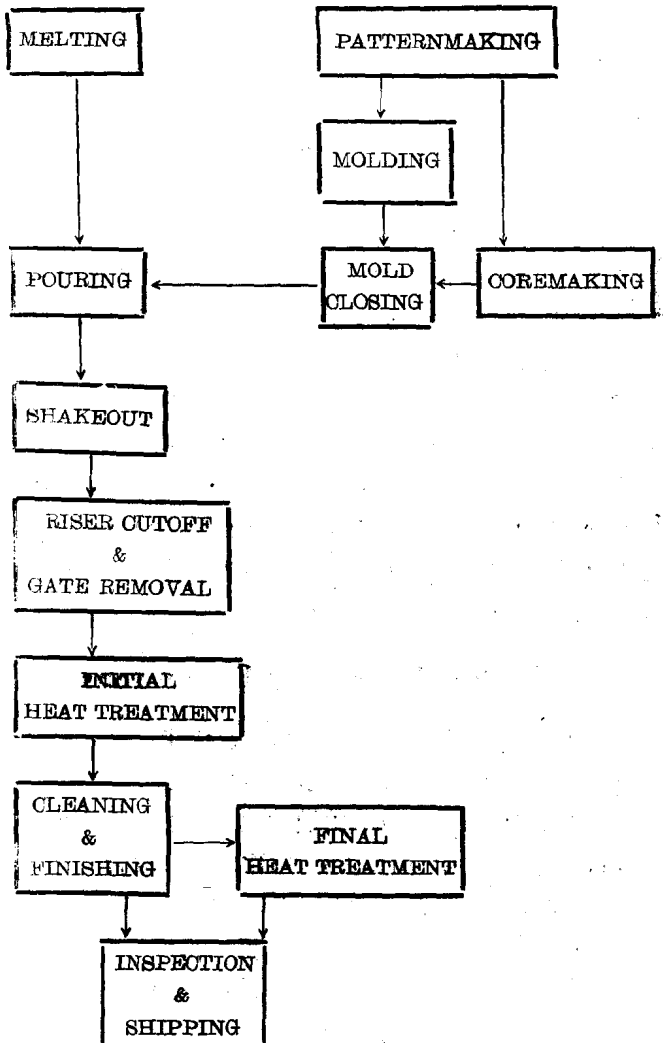

Fig. 1–1 Simplified flow diagram of the basic operations for producing a steel casting.

less prone to cracking. This heat treatment may occur prior to gate and riser removal with certain sizes and alloys of castings. Castings are then cleaned by a variety of methods and some, depending on their service, receive specialized heat treatments like quenching.

Final inspection assures that the customer receives the quality product which he ordered. Quality control is built into all phases of steel foundry operations from the preparation of sand for molds and cores to the melting, cleaning, and heat treatment operations. Quality assurance is required by customers for casting which will see special service. Many methods of nondestructive testing are used to assure various aspects of quality.

New Words and Expressions

casting ['kɑ:stiŋ] *n.* 铸件,铸造,浇注
process ['prouses] *n.* 工序,过程,方法
critical ['kritikəl] *a.* 关键的,临界的
operation [ɔpə'reiʃən] *n.* 操作,工序,运转
flow sheet 流程图,工艺流程
flow diagram 流程图,工艺流程
component [kəm'pounənt] *n.* 零件,组元
pattern ['pætən] *n.* 模样
mold [mould] *n.* 铸型
clay-bonded sand 粘土砂

ram [ræm] *v.* 舂紧，紧实
binder ['baində] *n.* 粘结剂
manual ['mænjuəl] *a.* 手工的，人工的
compaction [kəm'pækʃən] *n.* 紧实，压实
reassemble ['ri:ə'sembl] *v.* 重新装配
in the shape of 以……的形状
cavity ['kæviti] *n.* 空腔，型腔
passageway ['pæsidʒwei] *n.* 通道
core box 芯盒
be subsequent to 在……之后
drag [dræg] *n.* 下箱，下型
cope [koup] *n.* 上箱，上型
melting ['meltiŋ] *n.* 熔化，熔炼
tap [tæp] *v.* 出钢，开孔引出液体
furnace ['fə:nis] *n.* 熔炉
ladle ['leidl] *n.* 浇包
pour [po:] *v.* 浇注
solidify [sə'lidifai] *v.* 凝固
shake out 落砂，震动落砂
riser ['raizə] *n.* 冒口
gate [geit] *n.* 浇道，内浇道
be attached to 连在……上
reservoir ['rezəvwɑ:] *n.* 贮液池，容器
compensate ['kɔmpenseit] *v.* 补偿
shrinkage ['ʃriŋkidʒ] *n.* 收缩，收缩量
stress [stres] *n.* 应力
be prone to 易于，倾向于

cracking ['krækiŋ] *n.* 裂纹,开裂
quenching ['kwentʃiŋ] *n.* 淬火
inspection [in'spekʃən] *n.* 检验
heat treatment 热处理
quality control 质量控制
foundry ['faundri] *n.* 铸造,铸造厂
cleaning ['kli:niŋ] *n.* 清理,清砂
quality assurance 质量保证
nondestructive ['nondis'trʌktiv] *a.* 非破坏性的
nondestructive testing 无损探伤

Notes

1. There are …, depending on the … established by the customer.

depending on … 是现在分词短语,作伴随状语用。句中 the type of steel cast, the complexity of the component shape 以及 the quality requirements … 是三个并列的介词宾语, cast 和 established 都是过去分词,作后置定语用,分别修饰它前面的名词。

2. Molds are … so that the pattern … readily.

句中 so that = in order that 引导目的状语从句。so that 也可引导结果状语从句,究竟作何用,可由上下文判断,但有时也可从形式上区别:

1) so that 前无逗号时常引导目的状语从句,如前有逗号可能引导结果状语从句。
2) so that 引导的从句中有情态动词 may, can, could, would… 时,常为目的状语从句。

3) so that 引导的从句，如句中谓语动词的动作未完成，则多半为目的状语从句，如其谓语动词的动作已完成，则多半为结果状语从句。

3. Cores are parts made of … which … mold.

本句由主句和定语从句构成。which 引导的是定语从句，但和它所修饰的名词 cores 隔开了。一般，定语从句紧接在其修饰的先行词后，但为了句子结构的匀称，分隔也是允许的。从句中的 to be inserted in a mold 是被动不定式短语作状语。当句中有 too, enough, sufficiently 等作修饰语时常用不定式作状语。

4. Gates are … through which liquid … into the mold cavity proper.

句中 through which 引导的是定语从句，它在句中作状语。科技文章中常用此"介词＋which"来引导定语从句。

从句中的 proper 为形容词。一般形容词放在所修饰的名词之前，但下列情况形容词可后置：

1) 修饰以 -body, -one, -thing, -where 结尾的不定代词时，形容词后置。如：

Have you read anything interesting lately?

你最近读过什么有趣的东西吗？

2) 以 -ible 或 -able 结尾的形容词可放在所修饰的名词之后。如：

Are there any tickets available?

还有票吗？

3) 少数形容词可前置也可后置，但意义不同。如：

the members present 在座的成员

the present members 现在的成员

proper 前置时的意思是“合适的”,“真正的”，后置时表示“本身”之意。如:

proper materials 适宜的材料

the furnace proper 炉子本体

本文中 the mold cavity proper 指限于铸型的型腔部分,不包括铸型其它部分。

Lesson 2

Conventional Molding Processes for Static Casting (1)

When a mold is stationary during pouring, the resulting casting is known as a static casting. Static castings may be produced from molds made in a number of different ways.

Green Sand Molding Green sand molding is the most popular method used in steel foundries for production of castings. The term "green sand" does not refer to the color of the molding sand but denotes sand which has been bonded with bentonite, cereal, and water. The properties of green sand are adjustable within wide limits which makes it possible to use this sand on all types of mold-making equipment, from hand molding to high production, high pressure molding machines.[1]

A variation of the green sand mold is the "skin dried" mold. The skin drying technique is used on molds prepared from green sand. These skin dried molds are preferred for the production of heavier castings (300 lb, 136 kg, and up). A refractory coating is also frequently brushed or sprayed onto the mold