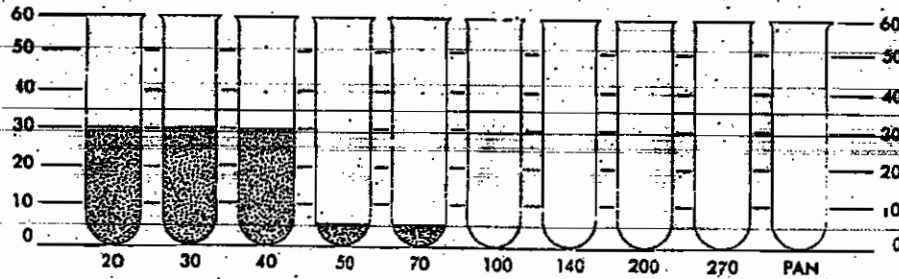


## 模砂粒度分布之影响

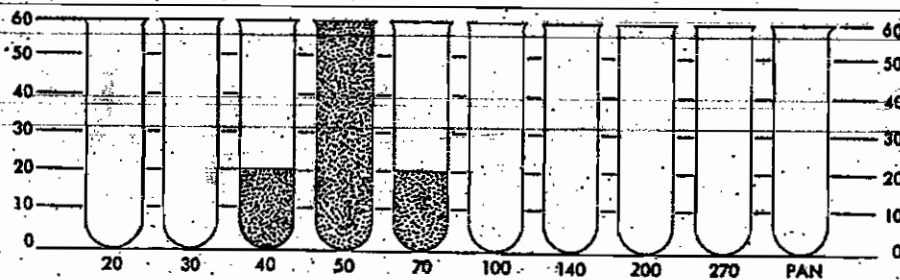
前三頁

下述为 5 个不同之模砂粒度分析值。即使我们每日或每周皆检测模砂粒度分布，但其仍存在某些不可靠性；造型人员应随时注意每次之模砂变化，掌握良好之型砂状况，以减少废品。



图一：此粗粒之三筛目模砂，会有较大之间隙，对造型作业不利。其将导致金属机械渗透（Mechanical metal penetration），产生粗糙之铸面，且制作成之砂模将脆化而易蚀砂。

PS：即铸件易有结砂、粗糙面、砂孔等缺陷。

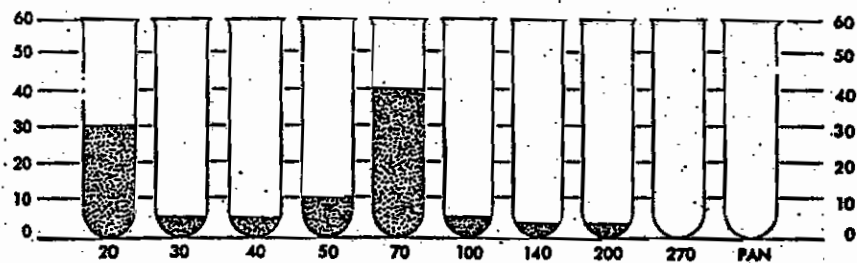


图二：此虽勉强属于三筛目砂，但其中一筛目砂超过 60%，如此之模砂需添加更多之粘土，木质素或木粉等以减少胀疵。这种分布范围窄小之模砂会引起胀疵（scab）、鼠尾（rat-tails）和胀疤（buckle）。

PS：1) 添加粘土等亦需添加更多之水分才容易混练均匀并达到一定之模砂硬度，如此，透气性差、气孔等问题亦随之发生；

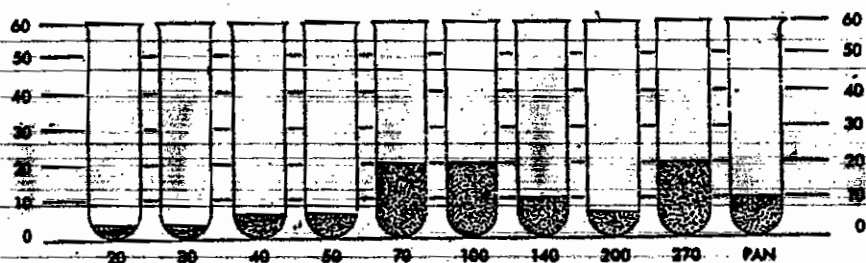
2) scab、rat-tails 和 buckle 之区分和成因，尔后教育训练再说明；

3) 即铸件易有胀疵、鼠尾和胀疤。



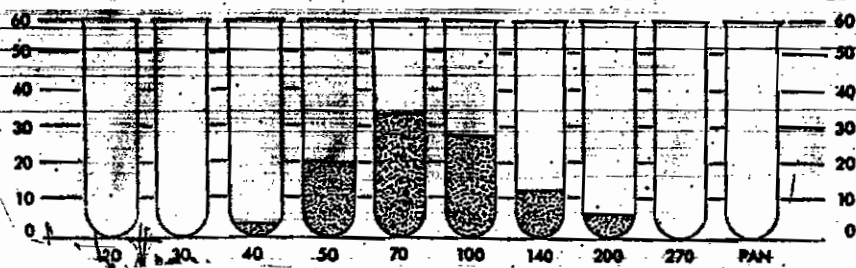
图三：此模砂为在 AFS 粒度指数 70 之型中添加某些粗砂而来，此种粒度分布因缺乏细粒砂而将导致砂模脆化且缺乏弹性和韧性；又因容易失水而可能产生蚀砂、冲砂和走样（尺寸变化）。

PS：即铸件易变形、有砂孔等。



图四：此模砂粒度分布集中在 70，100 和 270 附近，这种粒度分布将使砂模表面易吸湿而变形，因此会产生过大或过重之铸件，且亦因吸湿而常造成铸件气孔。

PS：即铸件易变形、产生气孔等。

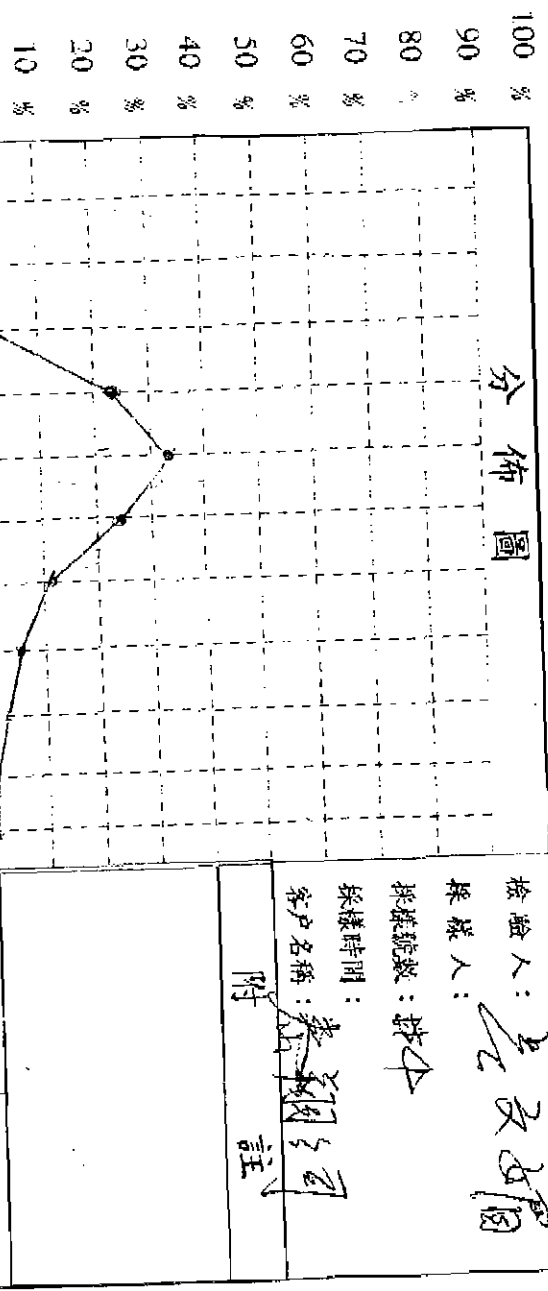


图五：此三筛目—四筛目之模砂为最理想之粒度分布，所需之粘结剂和水分最少，因此可生产出品质最好之铸件。

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# 矽砂規格檢驗表

94年9月14日



目數	10	30	40	50	70	100	200	270	Pan
重量	10	35	45	55	45	35	15	10	5
目數	2	36	69	132	174	253	372	50	27

檢驗人：張文雄  
採樣人：許中  
採樣時間：  
客戶名稱：泰和鋼鐵公司  
附註

合計 AFS. FN

品管：

廠長：

課長：

西子些(3140 < 1/6)会更好

此公司為台灣北部

泰和鋼鐵公司之鐵鋼廠

## Importance of Visual Analysis

Five visual screen analyses are shown on this and the next page. Even if the visual test tube analysis undertaken each day or week is not of immediate value, the psychological effect upon everyone concerned is of incalculable value. Everyone becomes conscious of daily sand variations, thus producing a closer supervision of the molding sand's changes so as to reduce casting scrap.

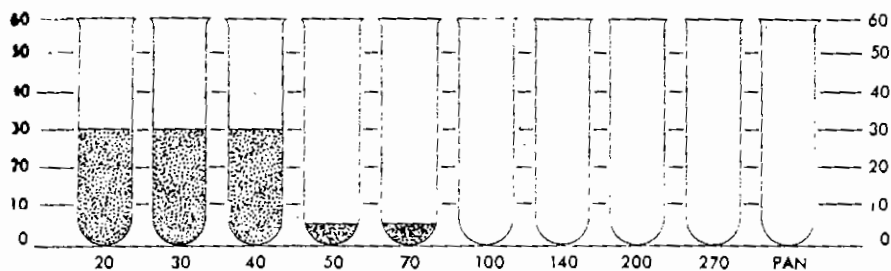


Fig. 97—This coarse three-screen sand has wide pore spaces and is unsatisfactory for good molding practice. Mechanical metal penetration generally results, and unless much finer material is added, casting surface is generally rough and these sand mixtures are often brittle and the mold surface may erode easily.

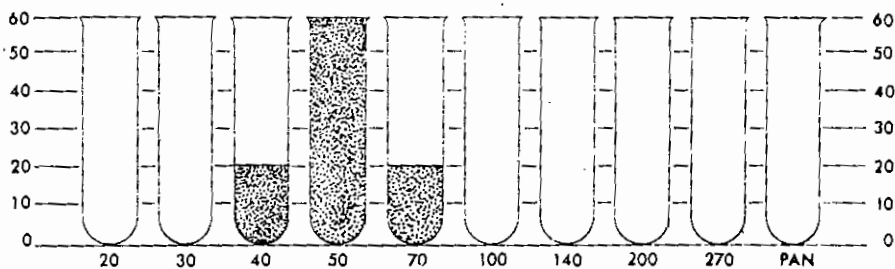


Fig. 98—A "three-screen sand" with over 60% retained on the U.S. Standard Sieve No. 50 requires more clay additives, cellulose, wood flour, and other additions so as to control sand expansion difficulties. Such a narrow distribution easily causes casting scabs, rat-tails or buckles.

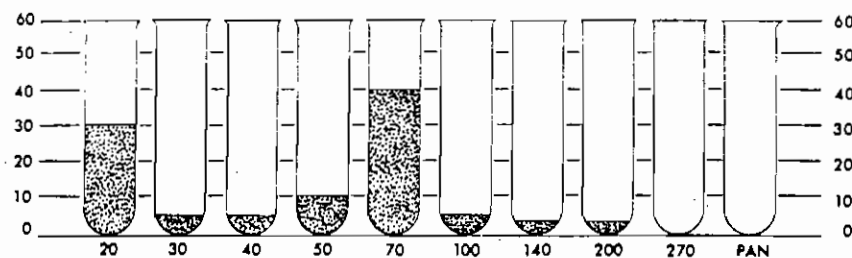


Fig. 99—This is a sand grain distribution of an AFS Grain Fineness No. 70 sand to which a coarser "opener" sand was added. This sand lacks fines, it is brittle and has poor resilience and toughness. It dries out easily and may erode, cut, wash, or ram-off unless adjustments are made in the bond and sand additives.

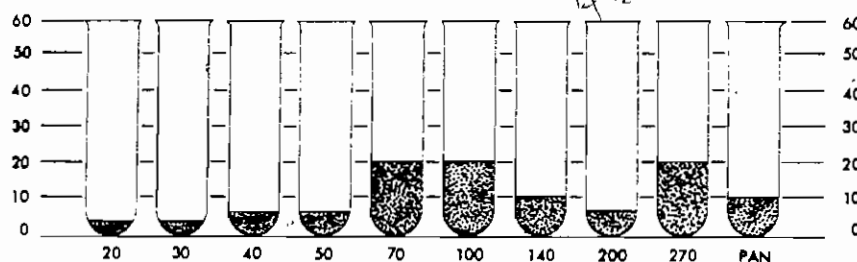


Fig. 100—This sand grain distribution has two peaks on the adjacent U.S. Standard Sieve Nos. 70 and 100 also, on the adjacent No. 270 U.S. Sieve and Pan. The surface area of the mold area produces a large bulking effect by soaking-up temper water too easily. Oversize and overweight castings may result and casting porosity is a common occurrence where such sand systems are used. ~~Apparent shrinkage caused by mold wall movement is common since large amounts of additives and bond are required to properly bond such a distribution.~~ This requires additional temper water which is detrimental to the casting results.

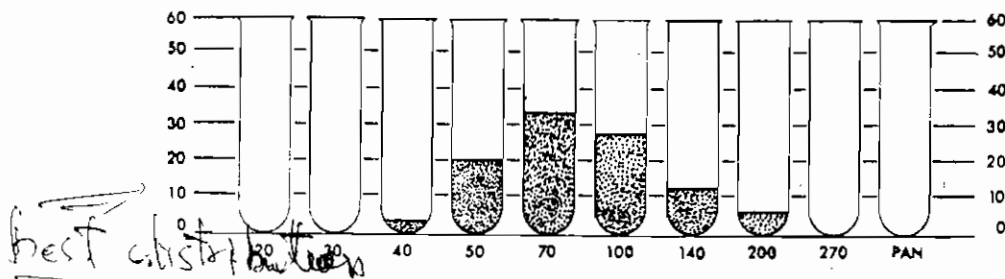


Fig. 101—Sands having a wide grain distribution are more easily bonded and tempered. These sands supply the best overall working conditions. Less bond and less temper water are required with this distribution, therefore, better casting results occur.