

The type of yarn and amount of twist affect the degree of interpenetration of the adhesive or rubber dip into the body of the yarn<sup>①</sup>. Investigations by Borroff and Wake (1949, 1951) have shown that, in the absence of adhesive, the degree of adhesion is dependent on the number of fibre ends embedded in the rubber<sup>②</sup> and is thus related to the surface area of the textile; the proportion of staple to continuous filament yarn in

a fabric influences the degree of bond strength (Table 3), and correlation has been established between the adhesion and the number of fibre ends in the rubber pulled off the fabric<sup>③</sup>. Because the method of application allows more even wetting and also greater interyarn penetration, the influence of fibre ends on adhesion is greater in the case of spread than of calendered fabrics.

**Table 3 DIRECT PULL TESTS — COMPARATIVE VALUES**

Rubber	Rayon			Acetate			Nylon		
	Continuous filament	20% staple	80% staple	Continuous filament	20% staple	80% staple	Continuous filament	20% staple	80% staple
Natural	88	130	165	79	117	139	75	143	240
Chloroprene	121	136	154	106	121	145	103	167	251
Nitrile	77	134	154	90	121	139	62	130	192

## 5. 2. 1 Development of Adhesives

The advent of continuous filament synthetic fibres presented problems owing to the absence of fibre ends and a lowered specific adhesion in some combinations of fibre and rubber. It was thus necessary to develop bonding agents to enable these materials to be used<sup>④</sup>. The development of the bonding systems progressed as the different types of fibre became available.

One of the earliest systems for bonding rayon was based on resorcinol-formaldehyde resin and natural rubber latex, but the material suffered from a limited pot life<sup>⑤</sup>. Bu-

tadiene-styrene and vinyl pyridine copolymer latices, in admixture with resorcinol-formaldehyde, followed. A later development was isocyanate adhesive. A modification of the latter was the formation of adducts, which were water soluble for easier application. With combinations of these systems, the range of fibres available can be pre-treated so that they will adhere to any rubber (Crocker, 1969; Takeyama and Matsui, 1969).

生 词

yarn

纱线

twist	捻度,捻
interpenetration	互相渗透
dip	浸渍
adhesive	粘合剂
end	末梢,端头;根(数)
embed	包埋,嵌入
staple	短纤维
continuous	
filament	长丝,长纤维
resorcinol-	
formaldehyde	间苯二酚-甲醛树脂
resin	脂,酚醛树脂
pot life	贮存寿命,贮存稳定期
butadiene	丁二烯
styrene	苯乙烯
vinyl pyridine	乙烯基吡啶
copolymer	共聚物
isocyanate	异氰酸酯
modification	改性,改进
adduct	加合物
pre-treat	预处理

## 译 文

纱线的种类和捻度影响着浸入纱线内的粘合剂或浸渍胶料的渗透量<sup>①</sup>。Borroff 和 Wake(1949,1951)的研究证明,不同粘合剂,粘合力的大小取决于埋在橡胶中纤维的末梢数<sup>②</sup>,而且也与织物的表面积有关;织物中短纤维与长纤维纱线的比例对粘合强度有影响(表3),而且已确立了剥离橡胶的织物中纤维末梢数和粘合力之间的关系<sup>③</sup>。由于涂胶法可使湿度更均匀,而且纱线间的渗透量更大,所以涂胶织物中纤维末梢对粘合力的影响要大于压延织物。

### 5.2.1 粘合剂的发展

长丝合成纤维的出现给橡胶和织物的粘合带来了问题,因为这种纤维无末梢,而且在某些纤维和橡胶复合制品中的粘合特性比较

表3 直接剥离试验结果比较

橡胶	人造丝			醋酸纤维			尼龙		
	长纤	20%	80%	长纤	20%	80%	长纤	20%	80%
		短纤	短纤		短纤	短纤		短纤	短纤
NR	88	130	165	79	117	139	75	143	240
CR	121	136	154	106	121	145	103	167	251
NBR	77	134	154	90	121	139	62	130	192

差。因此有必要研制能使这种材料投入使用的粘合剂<sup>④</sup>。随着各种类型的纤维应市,粘合体系的研制也在不断获得进展。

最早用于人造丝粘合的体系之一是以间苯二酚-甲醛树脂和天然胶乳为基础的,但是这种材料的贮存稳定期短<sup>⑤</sup>。其后的体系是丁二烯-苯乙烯和乙烯基吡啶共聚胶乳与间苯二酚-甲醛的混合物。较晚研制出来的是异氰酸酯粘合剂。一种改进方法是异氰酸酯制成更便于使用的可溶于水的加合物。将这些体系结合起来对所有市售纤维进行预处理,都可使之与任何一种胶粘合(Croker, 1969; Takeyama 和 Matsui, 1969)。

注:①此句中的“dip”是名词,“rubber dip”作“橡胶浸渍液”解;“into the body of the yarn”是动名词“interpenetration”的介词宾语;“degree of interpenetration”译为“渗透量”比“渗透度”好。

②“fibre ends”中的“end”一般作“根数”解,从本文中的上、下文所说的“长纤”、“短纤”来看,应为短纤的“末梢”。

③“pulled off the fabric”为“rubber”的后置定语。

④此句中第一个不定式“to develop bonding agents”是句子的真正主语;第二个不定式“to enable these materials to be used”为句子的目的状语,而其中的“to be used”为宾语补足语。

⑤“limited pot life”直译为“有限的贮存稳定期”,可转译为“贮存稳定期短”。