*Reinforced Concrete Design*
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Published by Tata McGraw-Hill, 2003
ISBN 0070495041, 9780070495043

$$R = A_{vf} f_y \sin \alpha_f + N$$

Reinforcement inclined at an angle $\alpha_f > 90°$ is ineffective in resisting interface shear, because, as relative slip between the two parts occurs and the reinforcement deforms, the effect is to separate the two parts farther rather than to introduce any clamping forces (Fig. 6.13c). Hence reinforcement with $\alpha_f \le 90°$ (i.e., placed such that shear force produces tension in the bar) only is effective as shear-friction reinforcement. [Indeed, this type of inclined bars will be more effective than bars perpendicular to the interface as tensile strains are initiated in the former sooner and more effectively than in the latter].

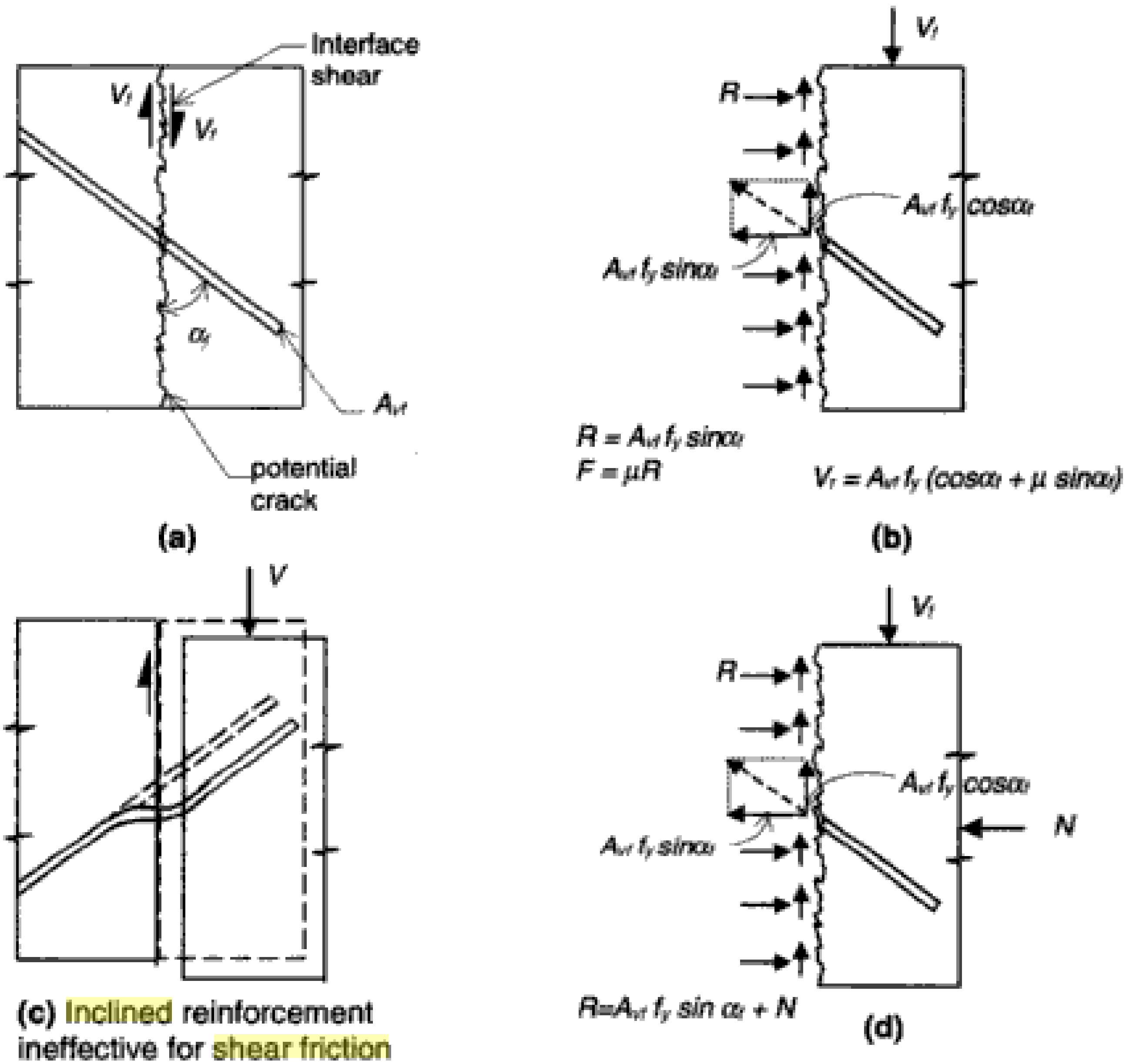


**Fig. 6.13** Inclined shear-friction reinforcement

If allowance is made for the shear strength contribution due to the cohesion between the two parts across the interface, the nominal shear resistance (for the general case of inclined shear-friction reinforcement and normal force $N$) can be obtained as:

$$v_m = c + \mu(\rho_v f_y \sin\alpha_f + N / A_g) + \rho_v f_y \cos\alpha_f \qquad (6.32)$$

where $c$ = stress due to cohesion

$N$ = load across shear plane (positive if compressive and negative if tensile)