TABLE 1--SPECIFIC GRAVITY, SPECIFIC SURFACE AREA AND CHEMICAL COMPOSITION OF CEMENT

type of cement	Specific gravity	blaine specific surface area (cm^2/g)	chemical composition (%)				
			SiO_2	Al_2O_3	Fe_2O_3	CaO	SO_3
CGC	2.96	4500	23	11	1	48	9
OPC	3.15	3100	22	5	3	65	2

TABLE 2--MIX PROPORTIONS OF GFRC

Type of GFRC	W/C (%)	S/C	Water-reducer	GF content (wt%)	setter	type of cement	flow * (mm)
new-GFRC	32.5	0.66	C×1%	5.0±0.5 3.5±0.5	C×0.3 ~0.5%	CGC	135
conv. -GFRC	35.0	0.66	C×1%	5.0±0.5 3.5±0.5	–	OPC HPC	135

*Flow cone (65mm diameter × 55mm height) was used.

TABLE 3--TEST PROGRAM

Test Items	Specimen Geometries (mm)			Total Number of Specimens	Testing Machine	Testing Method	Measurement Items
	Length	Width	Thickness				
Durability Test (Flexural strength)	250	50	10	60	2ton Autograph	Center-point loading (Cross head speed:2mm/min) (Span:200mm	Load-deflection curves (LOP, MOR)
Durability Test (Tensile strength)	380	40	10	60	2ton Autograph	Direct tension (Cross head speed:0.5mm/min)	Load-elongation curves (BOP, UTS)
Flexural Fatigue Test	250	50	10	36	5ton Servopulser	Center-point loading (Frequency:20Hz) (Span:300mm	Load-deflection curves (at every 2×10^5cycles) (at 2×10^6 cycles
Length Change Test in Wet and Dry Cycles	400	100	10	12	Comparator	—	Length change
Adhesive Test of Paint	70 (50)	70 (50)	10	40	10ton Instron	JIS A 6910	Adhesive strength
Flexural Strength Test of Plank	400	75	75	24	100ton Autograph	Third-point loading (Span:300mm)	Load-strain curves Load-deflection curves
Compressive Strength Test	75	75	75	48	100ton Autograph	—	Compressive strength
Freezing and Thawing Test	400	75	75	12	Comparator ASTM C 215	ASTM C666	Weight change Length change Relative dynamic elastic modulus

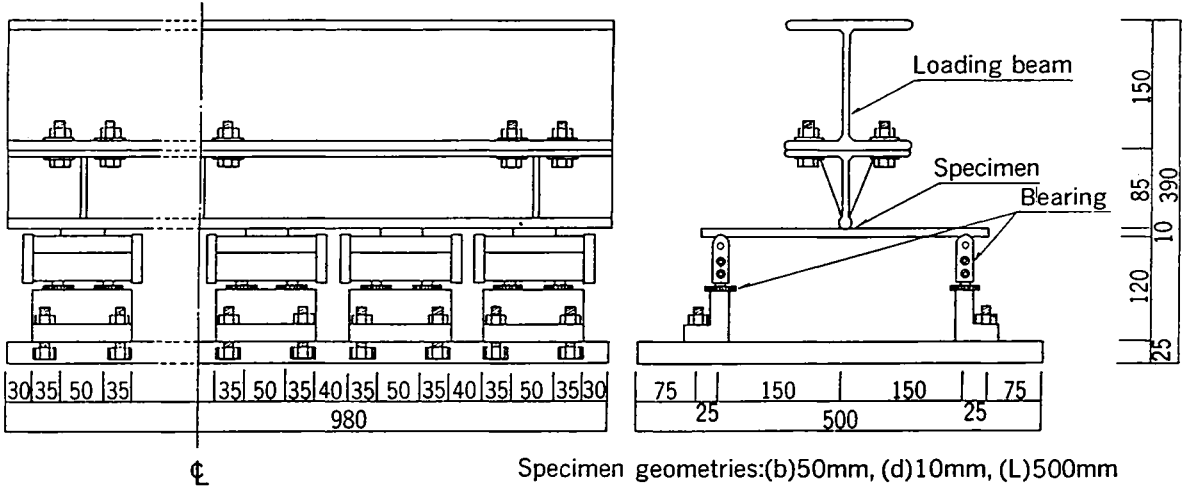

Fig. 1--Flexural fatigue testing method

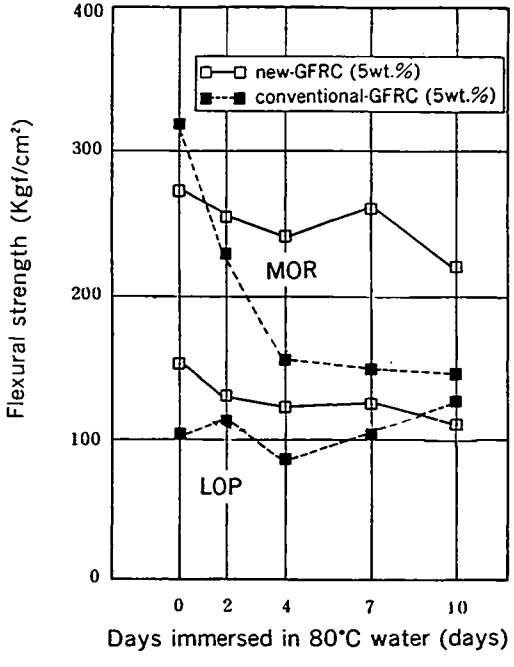

Fig. 2--Relation between days immersed in 80° C water and flexural strength of GFRC

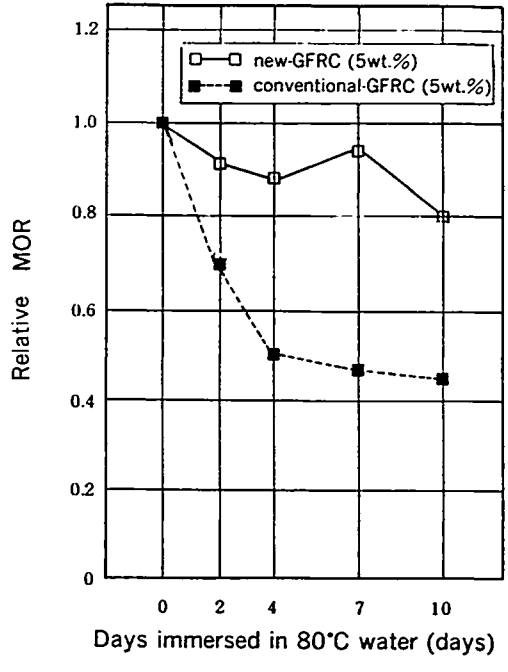

Fig. 3--Relation between days immersed in 80° C water and relative modulus of rupture of GFRC

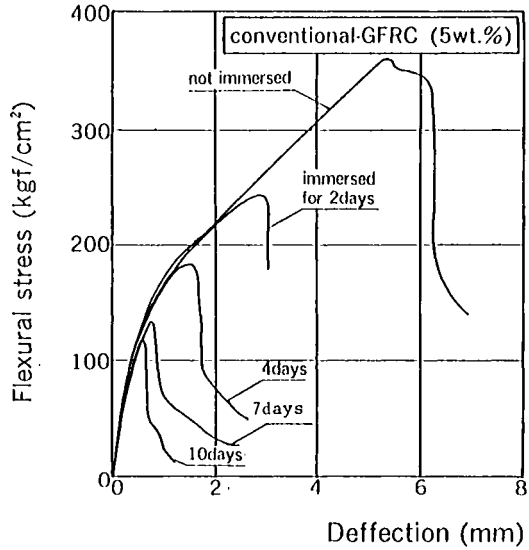

Fig. 4--Flexural stress-deflection curves for conventional-GFRC immersed in 80° C water

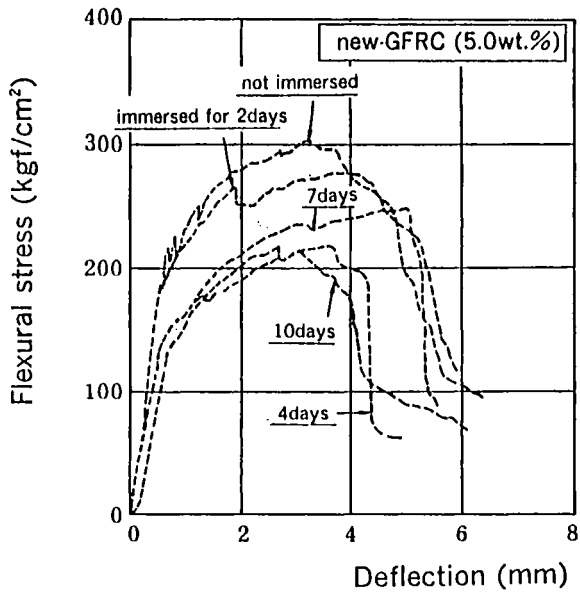

Fig. 5--Flexural stress-deflection curves for new-GFRC in 80° C water

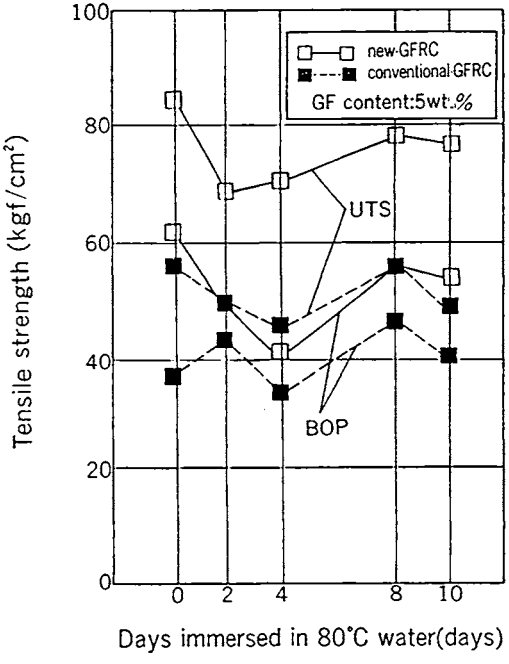

Fig. 6--Relation between days immersed in 80° C water and tensile strength of GFRC

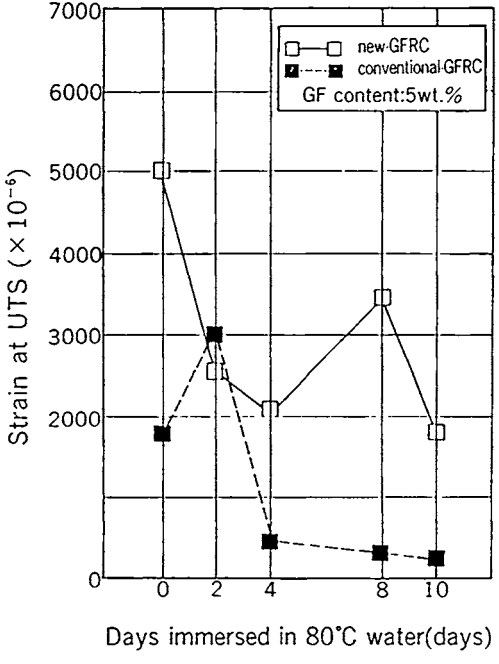

Fig. 7--Relation between days immersed in 80° C water and strain at UTS of GFRC

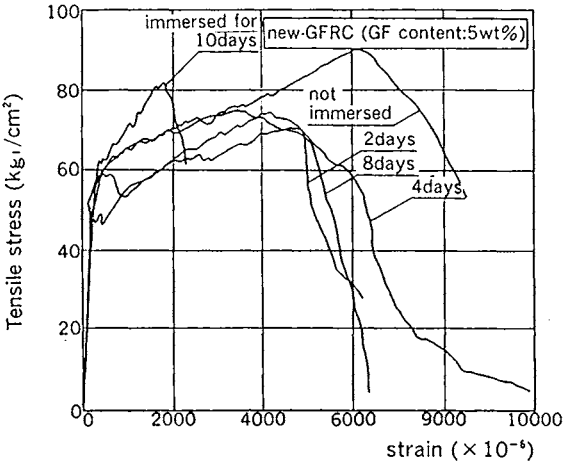

Fig. 8--Tensile stress-strain curves for new-GFRC immersed in 80° C water

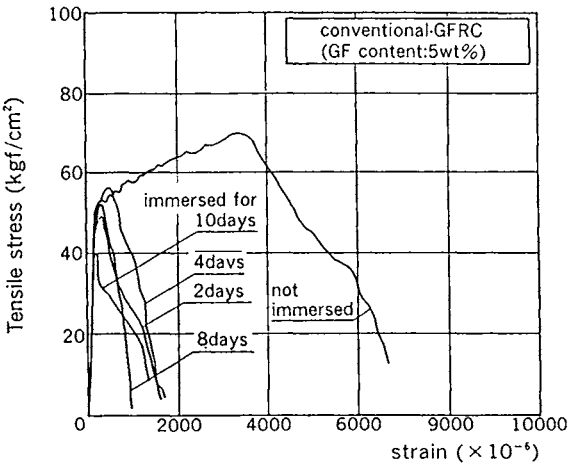

Fig. 9--Tensile stress-strain curves for conventional-GFRC immersed in 80° C water

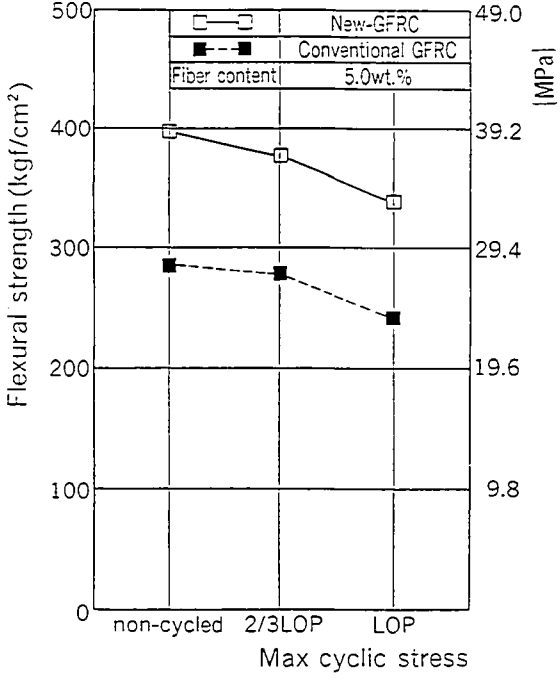

Fig. 10--Results of flexural fatigue test (flexural strength)

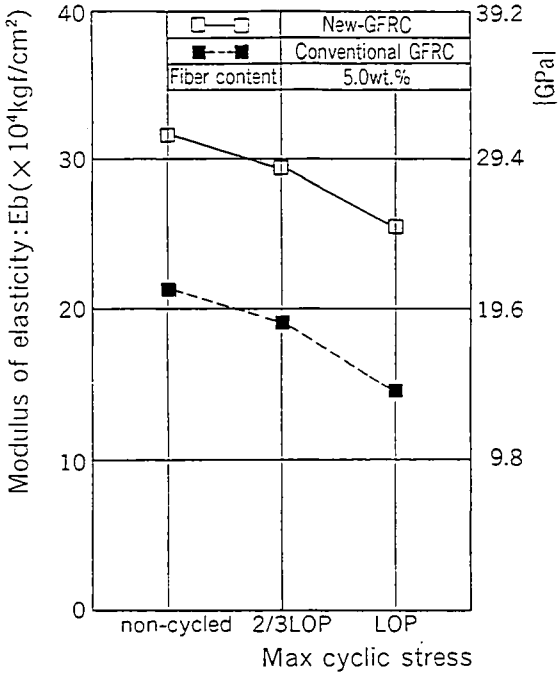

Fig. 11--Results of flexural fatigue test (modulus of elasticity)

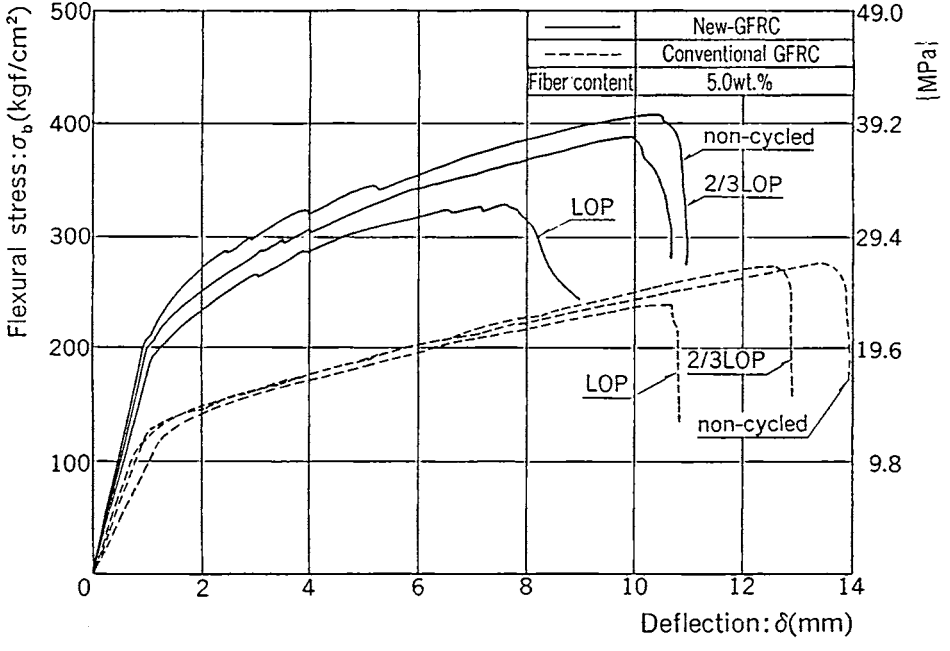

Fig. 12--Flexural stress-deflection curves

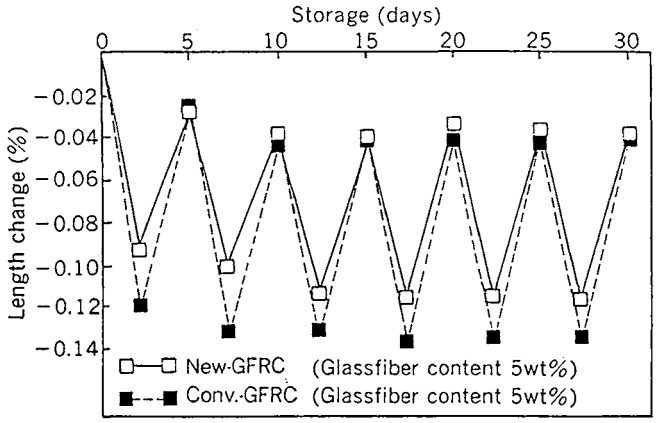

Fig. 13--Relation between drying at 70° C / wetting at 20° C cycle and length change

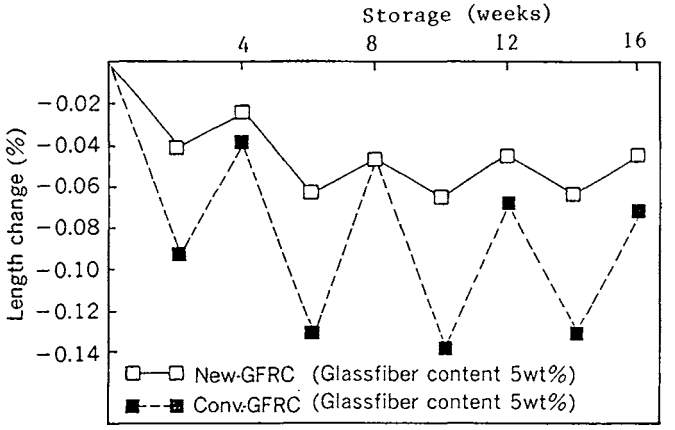

Fig. 14--Relation between drying at 20° C •30%RH / wetting at 20° C •90%RH cycle and length change