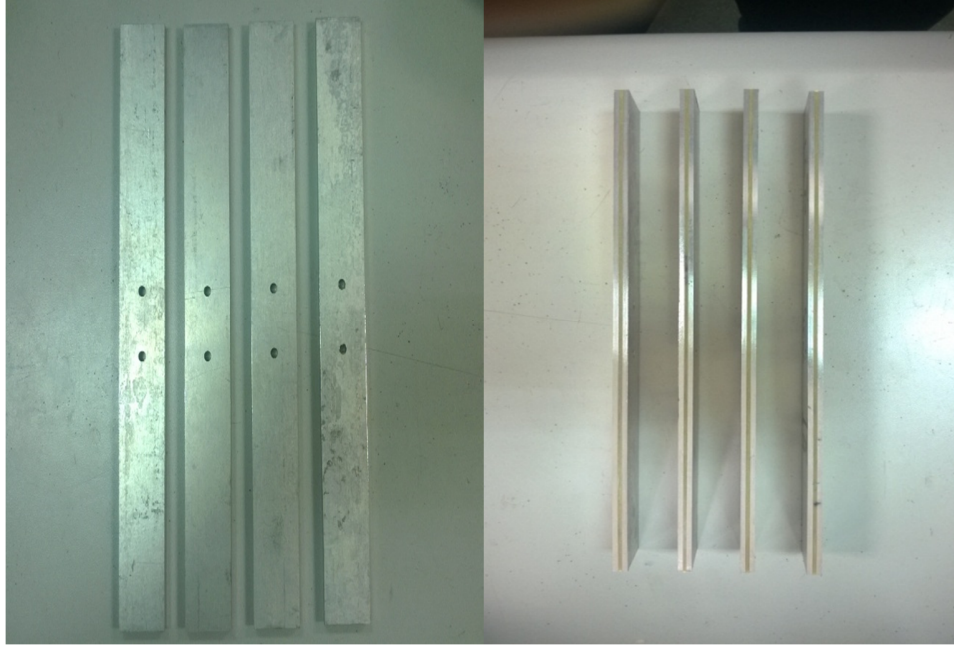
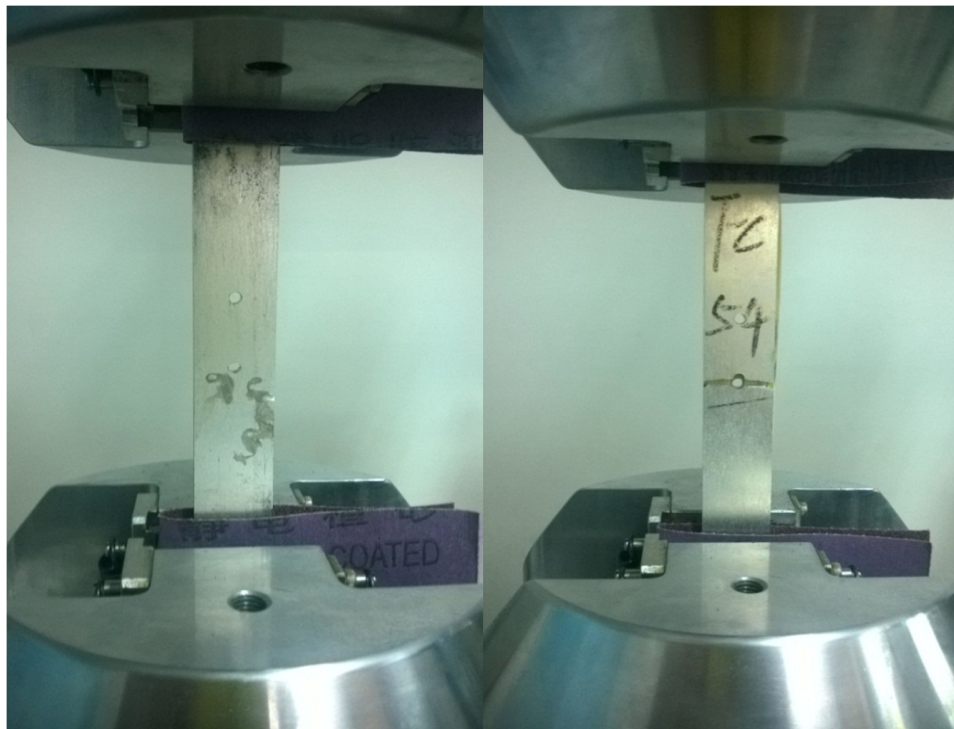


## SUPPLEMENTAL FILES

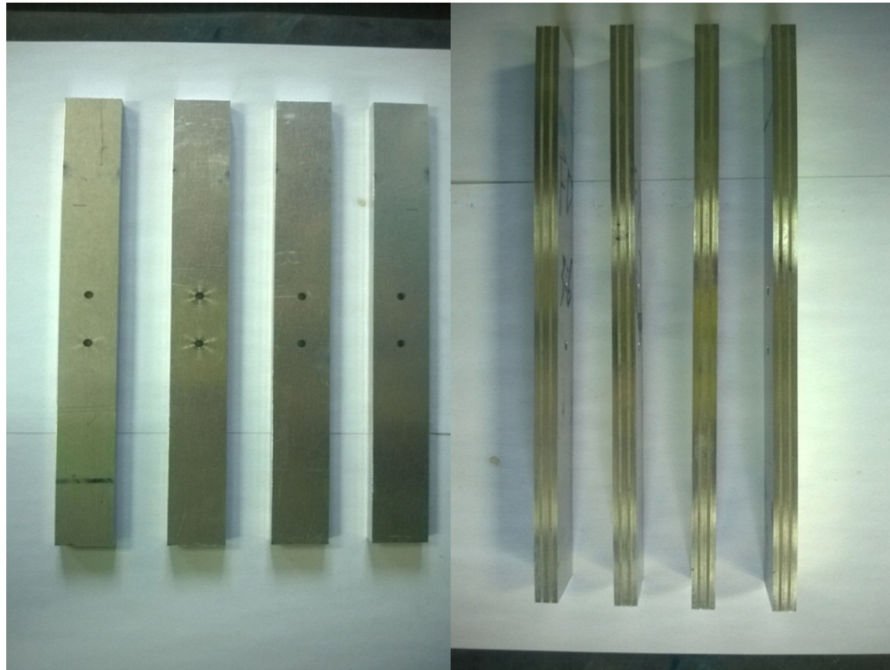
Figure



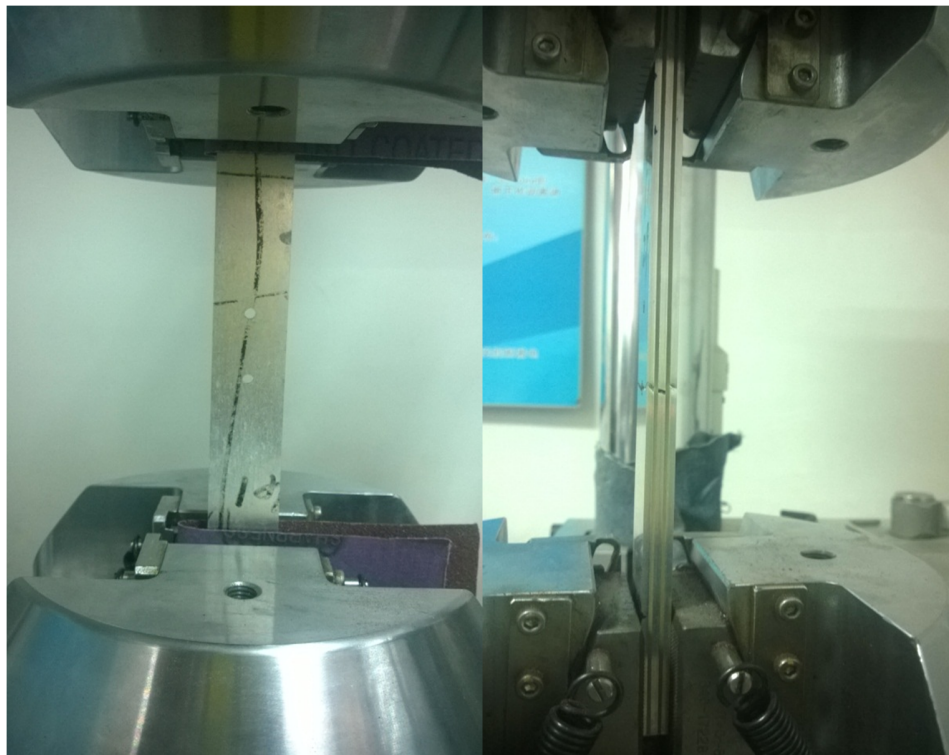
*(a) Fatigue test specimen of the 2/1 laminates*



*(b) Testing process and failure mode for the 2/1 laminates*



*(c) Fatigue test specimen of the 3/2 laminates*



*(d) Testing process and failure mode for the 3/2 laminates*

*Fig.1 The case of sample and test*

# Table

*Table 1 Fatigue test data of different materials under different loadings*

material	Loading mode	$S_{\max}$ /MPa	$N$ /cycle
2/1 Laminates	Constant amplitude R=0.06	200	60745
			22637
			38244
			29473
			29897
		120	139524
			106297
			312644
			110031
			109479
		100	268983
			245478
			304877
			360000
			196304
3/2 Laminates	Constant amplitude R=0.06	160	69437
			66248
			58370
			55767
		140	89895
			96748
			113595
			129731
			122911
		110	295664
			318784
			265702
			308466
			301285
2/1 Laminates	Constant amplitude R=-1	120	37246
			35159
			37851
			40479
		100	80143
			76765
			71330
			78157
			75322
		60	798661
			351355
			566372
			596657

3/2 Laminates	Constant amplitude R=-1	120	48970
			47399
			54265
			49113
			51503
		100	104798
			97001
			89640
			104443
			110322
		80	339013
			265884
			305719
			303384
			385232
2/1 Laminates	Mini-Twist	175	46220
			61914
			55242
			76048
			108584
		155	197652
			178955
			125053
		130	348877
			262398
			273966
			430206
		180	74364
			79897
			64793
			72971
		170	123424
			124073
			115449
			125603
		140	247652
			248301
			258893
			261405

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