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Fiber Reinforced Polymer (FRP) Confined Circular Concrete Columns: An Experimental Overview

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Abstract: Fiber-reinforced polymers (FRPs) are widely used as composite materials in civil engineering applications to rehabilitate or strengthen reinforced-concrete structural elements. The purpose of this study was to compile an extensive and up-to-date experimental database based on the compressive tests conducted on circular confined concrete structural elements using FRP composite materials. Strict criteria were implemented during the collection of the experimental data to minimize uncertainty and maximize uniformity. In order to compare the results, the collected data were divided into two categories based on the type of confinement, namely FRP wrapped and FRP tube encased. A detailed database of 1470 experimental test results on FRP-confined concrete cylindrical specimens demonstrated the specimens' geometry, the jacketing materials' physical and mechanical properties, and the effect of the confinement on the axial compressive strength and strain. The analysis of the database led to important observations on the parameters that influence FRP-confined concrete's behavior. The unconfined concrete strength seems to be inversely related to the confinement efficiency. The confinement efficiency is quite limited in high-strength concrete specimens. Carbon fibers tend to provide greater confinement effectiveness, while the FRP axial rigidity was found to contribute significantly to the effect of confinement. Glass and aramid fibers seem to perform equally well, regardless of the confinement method. An interesting finding is that while FRP-wrapped specimens perform similarly to tube-encased specimens in terms of increases in compressive strength, the latter are associated with larger increases in ultimate axial strains.

Keywords: fiber-reinforced polymers; FRP; composites; concrete confinement; jacketing; axial rigidity; compressive strength; experimental database

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1. Introduction

Reinforced concrete structures are exposed to seismic activity, aggressive environmental conditions, degradation due to age or changes in their use and, therefore, changes in loads. The structural deficiencies in civil engineering applications raise questions about the design and, moreover, about the safety of structures. In most cases, structural strengthening and rehabilitation are more profitable, economically and socially, than demolition and rebuilding [1,2]. Traditional strengthening methods, such as concrete or steel jacketing have been replaced by fiber confining, an effective method to improve seismic performance and, thus, axial strength, and the deformation capacity of existing reinforced-concrete structures.

This retrofitting technique functions by wrapping transversely a concrete element, using fiber-reinforced polymers (FRP) as the externally bonded strengthening materials [3]. The composite material, typically consisting of carbon, glass, or aramid fibers impregnated in a typically organic matrix, originally appeared as a promising material with which to increase the flexural, shear, and compressive capacity of concrete structural elements to achieve the performance required by modern regulations [4–8]. These FRPs have significant advantages, including high strength, very low weight, extremely high durability, availability in long lengths, corrosion resistance, and ease of application [9]. The differences between FRP materials are mostly affected by the properties of the fibers used. Although carbon fibers provide much higher strength, modulus, and fatigue resistance, they are associated with relatively limited deformability, especially in comparison to other fibers, such as glass, aramid or even basalt [10,11]. The cost of carbon fibers, on the other hand, is significantly higher than those of aramid, basalt, and glass fibers. These last three possess quite similar mechanical characteristics [12,13]. Although basalt fibers are very common in textile-reinforced mortar (TRM) systems, and have been used for confinement, they are not common in FRP systems [13,14].

When they are employed for concrete confinement, composite materials are activated when the specimen expands transversely, under axial compressive stress. At this point, tensile deformations develop in the fibers of the composite material, leading to transverse compressive stress vertically to the loading axis of the element. Consequently, the activated fibers offer confinement to the concrete core, and they continue to stress axially until they reach their maximum capacity. The FRP's transverse compressive stress leads to a significant increase in the maximum compressive strength and axial deformations of the concrete element.

More specifically, in a cylindrical concrete element with a diameter D, externally confined by a composite material with thickness t_{frp}, with a modulus of elasticity E_{frp}, as shown in Figure 1, the lateral stress developing in the composite material σ_l (equal and opposite forces are exerted on the concrete, as reinforcement stress) is provided by the following equation:

$$\sigma_l = \frac{2\,t_{frp}}{D}\sigma_f = \frac{2\,t_{frp}}{D}\,E_{frp}\,\varepsilon_f \quad (1)$$

where σ_f is the tensile stress and ε_f is the strain respectively.

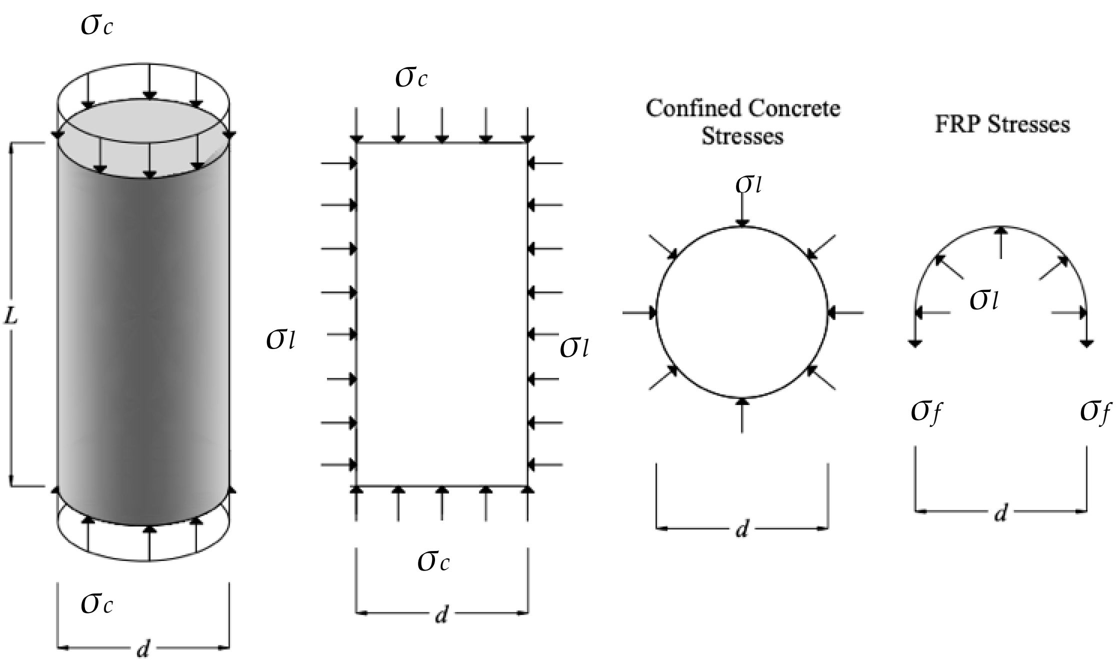

Figure 1. Cylindrical element confined by composite materials under axial compression and stress development owing to active confinement [15].

The active confinement of the concrete element and the resulting confinement stress contributes to:

1. A reduction in excessive concrete cracking, resulting in increased durability;
2. Increased deformability and, thus, concrete ductility;
3. A better force-transfer mechanism and the prevention of premature rebar slippage due to improved bonds between the concrete and the rebars.

Many experimental and analytical studies have been conducted, since the emergence of FRP composites as confining materials for reinforced concrete (RC) structures, to determine and model the contribution of these innovative composite materials in terms of compressive strength and axial deformation. In the last three decades, extensive research work has taken place, including numerous experiments conducted to estimate the behavior of confined concrete specimens. Even though the experiments were conducted using roughly the same procedure, a number of factors influenced the measurements and the subsequent processing of the test results, including:

- The laboratory conditions (temperature, humidity, etc.);
- The equipment and instruments used (hydraulic-loading test machines, the loading rate, the sensor sensitivity, the type of displacement sensor, etc.);
- The installation of the specimens and sensors (the gauge length, sensor placement, etc.);
- The measurement accuracy (noise and data processing) [16].

Important specimen-fabrication parameters have been identified that have a significant impact on experimental results, such as:

- The material properties and the detailed construction of concrete specimens (the water/cement ratio, cement quality, type and size of aggregates, adequate curing conditions, etc.) [17];
- Appropriate specimen preparation (careful cleaning, the application of the matrix, etc.);
- The application of composite materials (the type of composite material, selection of weaving pattern, placement and orientation of fibers, number of layers, quantity and density of resinous materials, proper confinement, length of the coating, etc.) [18].

Several experimental studies on concrete confined with FRP jackets were carried out, aiming at the development of reliable and accurate numerical models of its behavior. However, most of these studies were intended to develop analytical models based on relatively limited experimental results. Obviously, the main issue related to these models is that they are biased, and their applicability is limited to experimental data from studies that contain different type of specimen [8]. Since these analytical models were developed using experimental data, they can be only as good as the data from which they were derived. In order to ensure that models are not biased, it is imperative to use extensive databases, containing specimens of different sizes and concrete strengths, confined using different FRP materials.

Experimental databases have played an extremely important role in examining and understanding several physical phenomena, and they were the basis for the development of numerous experimental equations. More specifically, several researchers dealing with concrete confinement attempted to compile databases for use as essential verification tools for evaluating a model's effectiveness. Comprehensive reviews of experimental data on circular concrete specimens, the field of interest of this study, were reported by various researchers.

Lam and Teng [19] presented 199 test results categorized into three sets, according to the method used to determine the FRP material properties (flat coupons, splitting tests, and manufacturers, or unspecified sources). The statistical characteristics of these three sets of data showed that there is a linear relationship between the strength of confined concrete and the lateral confining pressure, whereas the unconfined concrete strength, the size, and the length-to-diameter ratio of the specimens and the FRP type do not contribute significantly on the confinement effectiveness. In addition, the authors' database was used to assess the performance of nine existing strength models for FRP-confined concrete. The test results showed a large scatter in terms of FRP-confinement effectiveness, revealing the limited test data and the inaccuracy in the reported FRP material properties as the main causes.

De Lorenzis and Tepfers [17] collected the experimental results of about 180 tests from 17 different experimental sets available in the literature. Both FRP wrapped confined specimens and confined specimens cast in FRP tubes were taken into consideration. The experimental results were compared to those of analytical models in an attempt to identify the most significant variables for compressive-strength enhancement. According to the authors, most of the available analytical models at the time were considered as empirical and were biased because they were calibrated against the experimental data sets of each study. Moreover, the authors claimed that the number of layers, the thickness, the elastic modulus of the FRP composite, and the cylinder's diameter were among the most important parameters affecting the ultimate strain. Furthermore, the FRP wraps were observed to rupture prematurely, at a tensile strain that was lower than the FRP uniaxial ultimate tensile strain. The FRP tubes, on the other hand, failed close to the predicted tensile strength.

Turgay et al. [20] employed 127 datasets of concrete cylinders confined with CFRP composite jackets in order to evaluate the compressive-strength predictions of five existing analytical models, aiming to determine the most accurate approach. According to their findings, the models overestimate the effect of confinement as the number of FRP layers used for confinement increases.

Realfonzo and Napoli [21] presented 465 compression tests performed on FRP-wrapped concrete cylinders. The collected results were used to perform a statistical evaluation of the influence of unconfined concrete strength (f_{co}) and fiber type on the FRP strain-efficiency factor (k_ε). Their study showed that the concrete strength has no significant effect on the efficiency factor. However, as the stiffness of the confining jacket rises, the value of the efficiency factor appears to slightly decrease.

According to Ozbakkaloglu and Lim [22], who presented 832 test results, covering 99 studies published between 1991 and 2013, the type of fiber used for confinement may influence the strain-reduction factor (k_ε). In addition, the authors suggested that the instrumentation arrangement used in specimen testing may significantly affect the accurate measurement of the ultimate axial strain (ε_{cu}) and hoop-rupture strain ($e_{h,rup}$), whereas the confinement technique used for specimens, FRP wrapping or tube encasing, does not appear to influence FRP-confined concrete's ultimate conditions.

Wang et al. [23] reported 77 test results on partially FRP-confined concrete. Their study pointed out that the failure modes of the partially FRP-confined specimens were different according to the applied strip gaps. In particular, when the strip gaps exceeded the specimen's diameter, the effectiveness of confinement was negligible, even though a high FRP volumetric ratio was used. On the other hand, the specimens with relatively small strip gaps failed due to FRP strip rupture.

However, some researchers, such as Wu et al. [24] and Bisby et al. [25] used published experimental data alongside their own experimental results to test their proposed models, without presenting all the detailed parameters of the experimental studies they utilized.

This paper presents the most extensive and up-to-date database of experimental data compiled from published experiments on cylindrical concrete structural elements confined with fiber-reinforced composite materials. A comprehensive literature review and assessment using specific criteria led to the compilation of 1470 test results from experimental studies conducted between 1991 and 2022 (almost double the size of the largest similar database, published by Ozbakaloglou and Lim [15]). The database provides information on material properties as well as experimental results, which are used to assess the effects of several parameters, such as unconfined concrete strength, fiber type, method of confinement, and axial rigidity, on the performance and efficiency of the confinement. Moreover, the presented database can be used as a base for the development and verification of analytical models, as well as for the implementation of statistical methodologies.

2. Experimental Database

A number of experiments on confined circular concrete specimens were identified through an extensive literature review. Data related to common test features, such as geometrical characteristics of the specimens, mechanical properties of the concrete, and information on the composite material, were carefully collected from each experimental study. All reported parameters were compiled into a complete experimental database that included 1470 experimental specimens.

More specifically, the database includes the following information for each specimen: geometrical properties, such as diameter (D) and height (H), and mechanical properties such as unconfined concrete strength (f_{co}) and strain (ε_{co}). Regarding the confining FRP material, information on elastic modulus (E_f), ultimate tensile strength (f_f), total composite thickness (t_f), and number of layers (num) is included on the database. The results of the experiments include ultimate compressive stress (f'_{cc}) and the corresponding ultimate axial strain (ε_{cu}) of each confined specimen, as well as the average hoop strain at rupture (ε_{h_rup}).

The authors aimed to compile a database with the lowest possible variability. With this in mind, great attention was paid to the consistency of the experimental data collected. Therefore, the test results present on this database had to satisfy certain criteria. The selection criteria used for the collection of data were:

1. Concrete specimens with a circular cross-section, with a height-to-diameter ratio of less than three.
2. Fiber sheets used for confinement oriented in the specimens' traverse direction.
3. Specimens tested by a hydraulic-compression testing machine under monotonic, concentric loading.
4. Datasets included specimens with ultimate conditions that corresponded to FRP rupture. Specimens that failed due to debonding of the FRP were excluded from the database.

The collected experimental data were initially categorized into two groups, according to the confinement technique. The term "Wraps" is used to describe specimens confined with externally bonded composite material, wrapped around the specimen, while the term "Tubes" is used to describe specimens cast in a prefabricated cylindrical composite mold.

A further distinction is made based on the unconfined concrete's compressive strength, which is known to affect confinement characteristics. Specimens with unconfined compressive strength of less than 15 MPa are listed as low in strength. For unconfined compressive strength values of up to 55 MPa, specimens are described as normal in strength, and specimens with unconfined strength above 55MPa are described as high in strength [26].

The database consists of 22 low' and 959 normal-strength and FRP-wrapped specimens, 157 tube-encased normal-strength specimens, 209 high-strength FRP-wrapped specimens, and 123 high-strength tube-encased specimens. Moreover, a further set of distinctions is provided in Table 1, according to the type of fibers used as wrapping materials:

- CFRP: carbon fibers
- GFRP: glass fibers
- AFRP: aramid fibers
- HM_UHM_CFRP (high modulus–ultra-high modulus CFRP): carbon fibers with a high or ultra-high elasticity modulus (E > 350 GPa).
- UB_TUBE (unbonded tube/CFRP, GFRP, AFRP): carbon, glass, or aramid fibers in the form of a prefabricated mantle (seamless) that can only be applied to new constructions. Due to the relatively small number of specimens, there is no category for fibers used for tube-encased specimens.

Table 1. Detailed categorization of specimens on experimental database.

Concrete Strength	Fiber Type	No. of Specimens
Low	CFRP	22
Normal	CFRP	608
	GFRP	236
	AFRP	67
	HM_UHM_CFRP	48
	UB_TUBE	157
High	CFRP	104
	GFRP	53
	AFRP	28
	HM_UHM_CFRP	24
	UB_TUBE	123
	total	1470

The experimental database is provided in the next two tables. More specifically, Table 2 includes experimental data from concrete specimens wrapped using externally bonded FRP sheets, whereas Table 3 presents data from experiments performed on specimens made by concrete casting in prefabricated FRP tubes. The formats of these two tables are identical. The first column presents the reference of the data, followed by the type of the confining material, as noted in Table 1, with the suffixes of L, N, or H for low, normal, and high compressive unconfined concrete strength of the specimen used. The next two columns present the geometrical properties of the cylindrical concrete specimens, such as diameter (D) and height (H). The concretes' mechanical properties follow, including the unconfined concrete strength (f_{co}) and corresponding strain (ε_{co}), axial rigidity ($\rho_f E_f$) as the product of material elastic modulus (E_{frp}) and FRP volumetric ratio $\left(\rho_f\right)$, which is calculated in the subsequent column using Equation (2):

$$\rho_f = \frac{4 \times t_{FRP}}{D} \tag{2}$$

In the next four columns, FRP -related properties are presented, including elastic modulus (E_f), tensile strength (f_f), total jacket thickness (t_f), and number of layers. Experimental results, such as ultimate compressive strength (f'_{cc}) and ultimate axial compressive strain of the confined concrete (ε_{cu}), as well as average hoop strain at rupture (ε_{h_rup}), are shown in the three subsequent columns.

Several researchers have claimed that mechanical properties of FRP measured in laboratory experiments are inferior to those provided by the manufacturers. Obviously, the hand-layup procedure affects the quality of the final material. Thus, it would have been ideal if all researchers had provided the mechanical properties of the FRP materials obtained from their experiments. Moreover, some researchers do not indicate the origin of their FRP properties, such as Micelli et al. [27], Karantzikis et al. [28], Ongpeng [29], and Aire et al. [30]. In these cases, it is assumed that the authors published the manufacturer's data. Some others, such as Mandal et al. [31], report some properties obtained through coupon tests, while others reported those provided by the FRP manufacturer.

It is well documented that the FRP hoop-rupture strain does not match the ultimate FRP axial tensile strain, and that it can be calculated from the fiber properties using the strain reduction factor ($k_{\varepsilon,f}$) [32]. More specifically, the strain-reduction factors $k_{\varepsilon,f}$ are calculated in this study as the ratio of the average hoop strain at rupture (ε_{h_rup}) in the FRP jacket to the ultimate tensile strain of the fibers (ε_f) specified by the manufacturer. The strain-reduction factors, $k_{\varepsilon,frp}$, are calculated using the FRP-composite ultimate strain ε_{frp} instead of the ε_f. It should be noted that hoop-rupture strains were obtained from strains recorded outside the overlap region of the composite jacket.

Finally, the last two columns provide information on the instrumentation used to obtain experimental measurements. The experimental setup used during a uniaxial concrete-compression test is quite simple. Typically, the load is measured using a load cell, and the strain is obtained using strain gauges externally bonded longitudinally and circumferentially to the specimen. However, strain gauges are known to record strains at specific points; thus, obtaining average strain requires the use of multiple sensors. Moreover, strain gauges are not reusable. Therefore, the use of strain gages is associated with relatively high costs, which leads many researchers to use other measurement methodologies.

The axial deformation of concrete specimens was recorded using different sensors/methods. While most researchers used strain gauges, some used compressometers, devices that consist of two aluminum rings, to which linear variable-displacement transformers are attached. Another methodology that was utilized was the use of digital cameras, known as digital-image correlation technique (DICT), a very precise, but quite expensive method. In order to provide detailed information, the following categories were created based on the method used to measure axial strains. In parentheses, the acronym for each category is mentioned:

(a) The digital-image-correlation technique (ADICT);
(b) Linear voltage-displacement transformers (LVDT's) and/or dial gauges mounted on the loading plates, stroke, or load cell. In this way, the displacement was measured over the full height of the specimen (ADF);
(c) LVDTs mounted on specimens using compressometers in order to avoid measuring the local strain on the ends of the specimen, or large-scale extensometers. Using this method, the gauge length was less than the specimen height (ADM);
(d) Strain gauges bonded on the specimens (ASG).

The following four categories were used for the measurements of the lateral strain:

(a) Digital-image-correlation technique (LDICT);
(b) LVDTs and dial gauges in the hoop direction (LDL);
(c) Strain gauges attached circumferentially (LSG).

However, a number of studies did not specify the type of instrumentation used to obtain the experimental values (N/A).

Table 2. Test database of FRP-wrapped concrete specimens.

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Erdil et al. [33]	CFRP_L	150	300	11.10	0.30	1.01	0.004	230	3430	0.17	1	32.90	4.20	-	-	-	LSG	ASG
Ilki et al. [16]	CFRP_L	150	300	6.20	0.20	1.01	0.004	230	3430	0.17	1	25.30	3.90	0.670	-	0.449	LSG	ASG
Ilki et al. [16]	CFRP_L	150	300	6.20	0.20	1.01	0.004	230	3430	0.17	1	19.40	2.60	-	-	-	LSG	ASG
Ilki et al. [16]	CFRP_L	150	300	6.20	0.20	2.03	0.009	230	3430	0.33	2	41.90	5.90	1.300	-	0.872	LSG	ASG
Ilki et al. [16]	CFRP_L	150	300	6.20	0.20	2.03	0.009	230	3430	0.33	2	40.00	5.90	-	-	-	LSG	ASG
Ilki et al. [16]	CFRP_L	150	300	6.20	0.20	3.05	0.013	230	3430	0.50	3	52.20	6.90	-	-	-	LSG	ASG
Ilki et al. [16]	CFRP_L	150	300	6.20	0.20	3.05	0.013	230	3430	0.50	3	56.90	7.50	1.100	-	0.738	LSG	ASG
Ilki et al. [16]	CFRP_L	150	300	6.20	0.20	4.07	0.018	230	3430	0.66	4	76.60	8.80	-	-	-	LSG	ASG
Ilki et al. [16]	CFRP_L	150	300	6.20	0.20	4.07	0.018	230	3430	0.66	4	69.70	7.60	-	-	-	LSG	ASG
Ilki et al. [16]	CFRP_L	150	300	6.20	0.20	5.09	0.022	230	3430	0.83	5	87.70	9.10	-	-	-	LSG	ASG
Ilki et al. [16]	CFRP_L	150	300	6.20	0.20	5.09	0.022	230	3430	0.83	5	82.70	9.40	-	-	-	LSG	ASG
Ilki et al. [16]	CFRP_L	150	300	6.20	0.20	6.11	0.027	230	3430	0.99	6	108.30	10.40	-	-	-	LSG	ASG
Ilki et al. [16]	CFRP_L	150	300	6.20	0.20	6.11	0.027	230	3430	0.99	6	103.30	9.60	-	-	-	LSG	ASG
Karantzikis et al. [28]	CFRP_L	200	350	12.10	0.22	0.55	0.002	230	3500	0.12	1	29.25	1.92	-	-	-	N/A	N/A
Pon et al. [34]	CFRP_L	450	900	7.10	-	0.46	0.002	235	4410	0.22	2	15.50	-	-	-	-	N/A	N/A
Pon et al. [34]	CFRP_L	450	900	7.10	-	0.69	0.003	235	4410	0.33	3	21.20	-	-	-	-	N/A	N/A
Pon et al. [34]	CFRP_L	300	600	7.20	-	0.69	0.003	235	4410	0.22	2	21.10	-	-	-	-	N/A	N/A
Pon et al. [34]	CFRP_L	300	600	7.20	-	1.04	0.004	235	4410	0.33	3	26.80	-	-	-	-	N/A	N/A
Pon et al. [34]	CFRP_L	600	1200	7.40	-	0.34	0.001	235	4410	0.22	2	12.80	-	-	-	-	N/A	N/A
Pon et al. [34]	CFRP_L	600	1200	7.40	-	0.52	0.002	235	4410	0.33	3	16.70	-	-	-	-	N/A	N/A
Pon et al. [34]	CFRP_L	150	300	9.60	-	1.38	0.006	235	4410	0.22	2	34.10	-	-	-	-	N/A	N/A
Pon et al. [34]	CFRP_L	150	300	9.60	-	2.07	0.009	235	4410	0.33	3	44.90	-	-	-	-	N/A	N/A
Abdelrahman and El-Hacha [35]	CFRP_N	300	600	38.30	-	0.33	0.005	65	895	0.38	2	72.00	-	-	-	-	LDICT	ADICT
Aire et al. [30]	CFRP_N	150	300	42.00	0.24	0.75	0.003	240	3900	0.12	1	46.00	0.92	0.380	-	0.234	LSG	ASG
Aire et al. [30]	CFRP_N	150	300	42.00	0.24	2.25	0.009	240	3900	0.35	3	77.00	2.12	0.880	-	0.542	LSG	ASG
Aire et al. [30]	CFRP_N	150	300	42.00	0.24	4.51	0.019	240	3900	0.70	6	108.00	3.16	1.320	-	0.812	LSG	ASG
Akogbe et al. [36]	CFRP_N	100	200	26.50	0.31	1.62	0.007	242	3248	0.17	1	64.30	2.55	-	-	-	LSG	ASG
Akogbe et al. [36]	CFRP_N	100	200	26.50	0.31	1.62	0.007	242	3248	0.17	1	63.00	2.18	-	-	-	LSG	ASG
Akogbe et al. [36]	CFRP_N	100	200	26.50	0.31	1.62	0.007	242	3248	0.17	1	66.40	2.29	-	-	-	LSG	ASG
Akogbe et al. [36]	CFRP_N	100	200	26.50	0.31	1.62	0.007	242	3248	0.17	1	64.80	2.48	-	-	-	LSG	ASG
Akogbe et al. [36]	CFRP_N	200	400	21.70	0.22	1.62	0.007	242	3248	0.33	2	64.30	2.79	-	-	-	LSG	ASG
Akogbe et al. [36]	CFRP_N	200	400	21.70	0.22	1.62	0.007	242	3248	0.33	2	69.10	2.69	-	-	-	LSG	ASG
Akogbe et al. [36]	CFRP_N	200	400	21.70	0.22	1.62	0.007	242	3248	0.33	2	60.10	2.10	-	-	-	LSG	ASG
Akogbe et al. [36]	CFRP_N	200	400	21.70	0.22	1.62	0.007	242	3248	0.33	2	66.30	2.54	-	-	-	LSG	ASG
Akogbe et al. [36]	CFRP_N	300	600	24.50	0.22	1.62	0.007	242	3248	0.50	3	58.80	1.80	-	-	-	LSG	ASG
Akogbe et al. [36]	CFRP_N	300	600	24.50	0.22	1.62	0.007	242	3248	0.50	3	59.40	2.00	-	-	-	LSG	ASG
Akogbe et al. [36]	CFRP_N	300	600	24.50	0.22	1.62	0.007	242	3248	0.50	3	63.00	1.90	-	-	-	LSG	ASG
Akogbe et al. [36]	CFRP_N	300	600	24.50	0.22	1.62	0.007	242	3248	0.50	3	60.60	2.00	-	-	-	LSG	ASG
Al-Salloum [37]	CFRP_N	150	300	32.40	0.21	2.42	0.032	75	935	1.20	1	83.16	3.23	-	-	-	N/A	N/A
Al-Salloum [37]	CFRP_N	150	300	36.20	0.21	2.42	0.032	75	935	1.20	1	85.04	3.23	-	-	-	N/A	N/A
Benzaid et al. [38]	CFRP_N	160	320	25.93	0.27	0.77	0.003	238	4300	0.13	1	39.63	1.28	1.310	-	0.725	LSG	ASG
Benzaid et al. [38]	CFRP_N	160	320	25.93	0.27	2.33	0.010	238	4300	0.39	3	66.14	1.52	1.320	-	0.731	LSG	ASG
Benzaid et al. [38]	CFRP_N	160	320	49.46	0.17	0.77	0.003	238	4300	0.13	1	52.75	0.25	0.290	-	0.161	LSG	ASG

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Benzaid et al. [38]	CFRP_N	160	320	49.46	0.17	2.33	0.010	238	4300	0.39	3	82.91	0.73	1.320	-	0.731	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	25.00	0.23	0.95	0.004	230	3200	0.17	1	42.80	1.63	0.957	-	0.688	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	25.00	0.23	0.95	0.004	230	3200	0.17	1	37.80	0.93	0.964	-	0.693	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	25.00	0.23	0.95	0.004	230	3200	0.17	1	45.80	1.67	0.960	-	0.690	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	25.00	0.23	1.90	0.008	230	3200	0.33	2	56.70	1.73	0.899	-	0.646	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	25.00	0.23	1.90	0.008	230	3200	0.33	2	55.20	1.58	0.911	-	0.655	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	25.00	0.23	1.90	0.008	230	3200	0.33	2	56.10	1.68	0.908	-	0.653	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	0.63	0.003	230	3200	0.11	1	49.80	0.55	1.015	-	0.730	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	0.63	0.003	230	3200	0.11	1	50.80	0.66	0.952	-	0.684	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	0.63	0.003	230	3200	0.11	1	48.80	0.61	1.203	-	0.865	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	0.95	0.004	230	3200	0.17	2	53.70	0.66	0.880	-	0.633	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	0.95	0.004	230	3200	0.17	2	54.70	0.62	0.853	-	0.613	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	0.95	0.004	230	3200	0.17	2	51.80	0.64	1.042	-	0.749	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	1.27	0.006	230	3200	0.22	2	59.70	0.60	0.788	-	0.566	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	1.27	0.006	230	3200	0.22	2	60.70	0.69	0.830	-	0.597	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	1.27	0.006	230	3200	0.22	2	60.20	0.73	0.809	-	0.581	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	2.54	0.011	230	3200	0.44	4	91.60	1.44	0.924	-	0.664	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	2.54	0.011	230	3200	0.44	4	89.60	1.36	0.967	-	0.695	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	2.54	0.011	230	3200	0.44	4	86.60	1.17	0.885	-	0.636	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	5.73	0.025	230	3200	0.99	9	142.40	2.46	0.989	-	0.711	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	5.73	0.025	230	3200	0.99	9	140.40	2.39	1.002	-	0.720	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	40.10	0.20	7.65	0.033	230	3200	1.32	12	166.30	2.70	0.999	-	0.718	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	52.00	0.23	1.90	0.008	230	3200	0.33	2	82.60	0.83	0.934	-	0.671	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	52.00	0.23	1.90	0.008	230	3200	0.33	2	82.80	0.70	0.865	-	0.622	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	52.00	0.23	1.90	0.008	230	3200	0.33	2	82.30	0.77	0.891	-	0.640	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	52.00	0.23	3.81	0.017	230	3200	0.66	4	108.10	1.14	0.667	-	0.479	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	52.00	0.23	3.81	0.017	230	3200	0.66	4	112.00	1.12	0.871	-	0.626	LSG	ASG
Berthet et al. [39]	CFRP_N	160	320	52.00	0.23	3.81	0.017	230	3200	0.66	4	107.90	1.12	0.882	-	0.634	LSG	ASG
Bisby et al. [40]	CFRP_N	150	300	34.40	0.33	0.74	0.003	231	4100	0.12	1	44.10	0.80	0.930	-	0.524	LDICT	ADICT
Bisby et al. [40]	CFRP_N	150	300	34.40	0.33	0.74	0.003	231	4100	0.12	1	44.10	0.87	1.100	-	0.620	LDICT	ADICT
Bisby et al. [40]	CFRP_N	150	300	34.40	0.33	0.74	0.003	231	4100	0.12	1	43.00	0.90	1.210	-	0.682	LDICT	ADICT
Bisby et al. [41]	CFRP_N	100	200	28.00	0.25	1.11	0.005	231	4100	0.12	1	63.00	-	-	-	-	LSG	ASG
Bisby et al. [41]	CFRP_N	100	200	28.00	0.25	1.11	0.005	231	4100	0.12	1	61.00	1.32	1.020	-	0.575	LSG	ASG
Bisby et al. [41]	CFRP_N	100	200	28.00	0.25	1.11	0.005	231	4100	0.12	1	53.00	1.06	1.000	-	0.563	LSG	ASG
Bouchelaghem et al. [42]	CFRP_N	160	320	26.00	-	0.72	0.013	55	750	0.52	1	56.28	-	-	-	-	LSG	ASG
Campione et al. [43]	CFRP_N	100	200	20.10	0.21	1.52	0.007	230	3430	0.17	2	49.60	2.55	-	-	-	N/A	N/A
Carey and Harries [44]	CFRP_N	254	762	38.90	0.30	1.15	0.016	73	875	1.00	1	54.80	1.04	1.000	-	0.829	LSG	ADM
Carey and Harries [44]	CFRP_N	152	305	33.50	0.23	1.13	0.045	25	350	1.70	1	46.80	0.93	1.480	-	1.057	LSG	ADM
Carey and Harries [44]	CFRP_N	152	305	32.10	-	0.66	0.003	250	3500	0.10	1	32.90	-	-	-	-	LSG	ADM
Carey and Harries [44]	CFRP_N	152	305	32.10	-	1.32	0.005	250	3500	0.20	2	41.70	-	-	-	-	LSG	ADM
Carey and Harries [44]	CFRP_N	152	305	32.10	-	1.98	0.008	250	3500	0.30	3	52.20	-	-	-	-	LSG	ADM
Carey and Harries [44]	CFRP_N	254	762	33.20	-	1.15	0.016	73	870	1.00	1	54.80	1.20	-	-	-	LSG	ADM

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Carey and Harries [44]	CFRP_N	153	305	33.50	-	1.31	0.005	250	3500	0.20	1	47.00	-	-	-	-	LSG	ADM
Carey and Harries [44]	CFRP_N	254	762	38.90	-	1.15	0.016	73	875	1.00	1	54.20	-	-	-	-	LSG	ADM
Chastre and Silva [45]	CFRP_N	250	750	35.20	-	1.36	0.006	241	3711	0.35	2	67.76	1.11	-	-	-	LSG	ADF
Chastre and Silva [45]	CFRP_N	150	750	38.00	-	2.02	0.009	226	3254	0.33	2	75.81	1.28	-	-	-	LSG	ADF
Chastre and Silva [45]	CFRP_N	151	750	38.00	-	2.01	0.009	227	3269	0.33	2	68.99	0.99	-	-	-	LSG	ADF
Chastre and Silva [45]	CFRP_N	152	750	38.00	-	2.01	0.009	228	3283	0.33	2	83.82	1.25	-	-	-	LSG	ADF
Chastre and Silva [45]	CFRP_N	153	750	38.00	-	3.01	0.013	229	3298	0.50	3	107.76	1.87	-	-	-	LSG	ADF
Cui and Sheikh [46]	CFRP_N	152	305	48.10	0.22	2.25	0.026	85	816	1.00	1	86.60	1.53	1.124	1.171	-	LSG	ADM
Cui and Sheikh [46]	CFRP_N	152	305	48.10	0.22	4.53	0.053	85	816	2.00	2	109.40	2.01	0.968	1.008	-	LSG	ADM
Cui and Sheikh [46]	CFRP_N	152	305	48.10	0.22	4.53	0.053	85	816	2.00	2	126.70	2.66	1.212	1.263	-	LSG	ADM
Cui and Sheikh [46]	CFRP_N	152	305	48.10	0.22	6.84	0.081	85	816	3.00	3	162.70	3.09	1.158	1.206	-	LSG	ADM
Cui and Sheikh [46]	CFRP_N	152	305	48.10	0.22	6.84	0.081	85	816	3.00	3	153.60	2.89	1.035	1.078	-	LSG	ADM
Cui and Sheikh [46]	CFRP_N	152	305	45.60	0.25	0.70	0.003	241	3639	0.11	1	57.70	1.21	1.678	-	1.111	LSG	ADM
Cui and Sheikh [46]	CFRP_N	152	305	45.60	0.25	0.70	0.003	241	3639	0.11	1	55.40	1.31	1.599	-	1.059	LSG	ADM
Cui and Sheikh [46]	CFRP_N	152	305	45.60	0.25	1.40	0.006	241	3639	0.22	2	78.00	1.97	1.616	-	1.070	LSG	ADM
Cui and Sheikh [46]	CFRP_N	152	305	45.60	0.25	1.40	0.006	241	3639	0.22	2	86.80	2.14	1.801	-	1.193	LSG	ADM
Cui and Sheikh [46]	CFRP_N	152	305	45.60	0.25	2.10	0.009	241	3639	0.33	3	106.50	2.90	1.786	-	1.183	LSG	ADM
Cui and Sheikh [46]	CFRP_N	152	305	45.60	0.25	2.10	0.009	241	3639	0.33	3	106.00	2.83	1.798	-	1.191	LSG	ADM
Cui and Sheikh [46]	CFRP_N	152	305	48.10	0.22	2.25	0.026	85	816	1.00	1	80.90	1.51	1.052	1.096	-	LSG	ADM
De Lorenzis et al. [47]	CFRP_N	150	300	38.00	-	1.10	0.012	91	1028	0.45	3	62.00	0.95	0.800	0.709	-	LSG	ASG
De Lorenzis et al. [47]	CFRP_N	150	300	38.00	-	1.10	0.012	91	1028	0.45	3	67.30	1.35	0.800	0.709	-	LSG	ASG
De Lorenzis et al. [47]	CFRP_N	120	240	43.00	-	0.91	0.010	91	1028	0.30	2	58.50	1.16	0.700	0.620	-	LSG	ASG
De Lorenzis et al. [47]	CFRP_N	120	240	43.00	-	0.91	0.010	91	1028	0.30	2	65.60	0.95	0.800	0.709	-	LSG	ASG
Demers and Neale [48]	CFRP_N	152	305	32.20	-	0.66	0.026	25	380	1.00	1	41.10	1.41	-	-	-	N/A	N/A
Demers and Neale [48]	CFRP_N	152	305	43.70	-	0.66	0.026	25	380	1.00	1	48.40	0.97	-	-	-	N/A	N/A
Demers and Neale [48]	CFRP_N	152	305	43.70	-	2.01	0.081	25	380	3.00	3	75.20	1.83	-	-	-	N/A	N/A
Demers and Neale [48]	CFRP_N	152	305	43.70	-	2.01	0.081	25	380	3.00	3	73.40	1.83	-	-	-	N/A	N/A
Dias da Silva and Santos [49]	CFRP_N	150	600	28.20	-	0.70	0.003	240	3700	0.11	1	31.40	0.39	0.260	0.169	0.169	LSG	ASG
Dias da Silva and Santos [49]	CFRP_N	150	600	28.20	-	1.41	0.006	240	3700	0.22	2	57.40	2.05	1.180	0.765	0.765	LSG	ASG
Dias da Silva and Santos [49]	CFRP_N	150	600	28.20	-	2.12	0.009	240	3700	0.33	3	69.50	2.59	1.140	0.739	0.739	LSG	ASG
Elsanadedy et al. [50]	CFRP_N	50	100	53.80	0.34	6.31	0.082	77	846	1.00	1	146.20	1.56	-	-	-	LSG	ADM
Elsanadedy et al. [50]	CFRP_N	100	200	49.10	0.36	3.12	0.040	77	846	1.00	1	94.50	1.09	-	-	-	LSG	ADM
Elsanadedy et al. [50]	CFRP_N	100	200	49.10	0.36	6.31	0.082	77	846	2.00	2	146.00	1.54	-	-	-	LSG	ADM
Elsanadedy et al. [50]	CFRP_N	150	300	41.10	0.36	2.08	0.027	77	846	1.00	1	76.40	0.95	-	-	-	LSG	ADM
Elsanadedy et al. [50]	CFRP_N	150	300	41.10	0.36	4.18	0.054	77	846	2.00	2	111.50	1.34	-	-	-	LSG	ADM
Elsanadedy et al. [50]	CFRP_N	150	300	41.10	0.36	6.31	0.082	77	846	3.00	3	144.20	1.49	-	-	-	LSG	ADM
Erdil et al. [33]	CFRP_N	150	300	20.80	0.30	1.01	0.004	230	3430	0.17	1	47.50	3.50	-	-	-	LSG	ASG
Evans et al. [51]	CFRP_N	152	305	37.30	-	1.48	0.006	240	3800	0.23	1	64.40	1.31	1.390	-	0.878	N/A	N/A
Green et al. [52]	CFRP_N	152	305	46.00	-	0.59	0.026	22	237	1.00	1	53.00	-	-	-	-	LSG	ADM
Green et al. [52]	CFRP_N	152	305	46.00	-	1.19	0.053	22	237	2.00	2	59.00	-	-	-	-	LSG	ADM

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Harmon and Slattery [53]	CFRP_N	51	102	41.00	-	1.66	0.007	235	3500	0.09	1	86.00	-	-	-	-	N/A	N/A
Harmon and Slattery [53]	CFRP_N	51	102	41.00	-	3.31	0.014	235	3500	0.18	1	120.50	-	-	-	-	N/A	N/A
Harmon and Slattery [53]	CFRP_N	51	102	41.00	-	3.31	0.014	235	3500	0.18	2	117.00	1.10	-	-	-	N/A	N/A
Harmon and Slattery [53]	CFRP_N	51	102	41.00	-	6.38	0.027	235	3500	0.34	4	158.00	2.00	-	-	-	N/A	N/A
Harmon and Slattery [53]	CFRP_N	51	102	41.00	-	12.89	0.055	235	3500	0.69	7	241.00	3.40	-	-	-	N/A	N/A
Harries and Kharel [54]	CFRP_N	152	305	32.10	0.28	0.42	0.026	16	174	1.00	1	32.90	0.60	1.030	0.929	0.736	N/A	N/A
Harries and Kharel [54]	CFRP_N	152	305	32.10	0.28	0.84	0.053	16	174	2.00	2	35.80	0.86	1.190	1.074	0.850	N/A	N/A
Harries and Kharel [54]	CFRP_N	152	305	32.10	0.28	1.26	0.081	16	174	3.00	3	52.20	1.38	1.550	1.399	1.107	N/A	N/A
Hosotani et al. [55]	CFRP_N	200	600	41.70	0.34	2.14	0.009	243	4227	0.44	1	93.00	2.10	-	-	-	N/A	ADF
Howie and Karbahari [56]	CFRP_N	152	305	38.60	-	0.59	0.008	73	755	0.31	1	45.50	-	-	-	-	N/A	N/A
Howie and Karbahari [56]	CFRP_N	152	305	38.60	-	0.59	0.008	73	755	0.31	1	41.90	-	-	-	-	N/A	N/A
Howie and Karbahari [56]	CFRP_N	152	305	38.60	-	0.59	0.008	73	755	0.31	1	47.20	-	-	-	-	N/A	N/A
Howie and Karbahari [56]	CFRP_N	152	305	38.60	-	1.14	0.016	71	1047	0.61	2	56.50	-	-	-	-	N/A	N/A
Howie and Karbahari [56]	CFRP_N	152	305	38.60	-	1.14	0.016	71	1047	0.61	2	60.60	-	-	-	-	N/A	N/A
Howie and Karbahari [56]	CFRP_N	152	305	38.60	-	1.14	0.016	71	1047	0.61	2	61.90	-	-	-	-	N/A	N/A
Howie and Karbahari [56]	CFRP_N	152	305	38.60	-	1.89	0.024	78	1105	0.92	3	80.90	-	-	-	-	N/A	N/A
Howie and Karbahari [56]	CFRP_N	152	305	38.60	-	1.89	0.024	78	1105	0.92	3	76.40	-	-	-	-	N/A	N/A
Howie and Karbahari [56]	CFRP_N	152	305	38.60	-	1.89	0.024	78	1105	0.92	3	75.80	-	-	-	-	N/A	N/A
Howie and Karbahari [56]	CFRP_N	152	305	38.60	-	3.10	0.032	96	1352	1.22	4	89.50	-	-	-	-	N/A	N/A
Howie and Karbahari [56]	CFRP_N	152	305	38.60	-	3.10	0.032	96	1352	1.22	4	89.90	-	-	-	-	N/A	N/A
Howie and Karbahari [56]	CFRP_N	152	305	38.60	-	3.10	0.032	96	1352	1.22	4	89.00	-	-	-	-	N/A	N/A
Howie and Karbahari [56]	CFRP_N	152	304	42.50	-	1.98	0.009	227	3500	0.33	2	44.87	0.68	-	-	-	LDL	ADF
Howie and Karbahari [56]	CFRP_N	152	304	42.50	-	3.96	0.017	227	3500	0.66	4	59.68	0.84	-	-	-	LDL	ADF
Howie and Karbahari [56]	CFRP_N	152	304	42.50	-	5.95	0.026	227	3500	0.99	6	77.71	0.84	-	-	-	LDL	ADF
Howie and Karbahari [56]	CFRP_N	152	304	42.50	-	7.95	0.035	227	3500	1.32	8	89.48	0.52	-	-	-	LDL	ADF
Ilki et al. [57]	CFRP_N	150	300	32.00	0.20	1.01	0.004	230	3430	0.17	1	47.20	1.44	0.790	-	0.530	LSG	ASG
Ilki et al. [57]	CFRP_N	150	300	32.00	0.20	3.05	0.013	230	3430	0.50	3	83.80	3.43	1.030	-	0.691	LSG	ASG
Ilki et al. [57]	CFRP_N	150	300	32.00	0.20	3.05	0.013	230	3430	0.50	3	91.00	3.92	1.080	-	0.724	LSG	ASG
Ilki et al. [57]	CFRP_N	150	300	32.00	0.20	5.09	0.022	230	3430	0.83	5	107.10	4.96	0.640	-	0.429	LSG	ASG
Ilki et al. [57]	CFRP_N	150	300	32.00	0.20	5.09	0.022	230	3430	0.83	5	107.70	4.32	1.000	-	0.671	LSG	ASG
Choudhury et al. [58]	CFRP_N	100	200	29.16	-	1.08	0.005	230	4900	0.12	1	55.94	0.25	-	-	-	LDICT	ADICT
Choudhury et al. [58]	CFRP_N	100	200	28.86	-	1.08	0.005	230	4900	0.12	1	55.05	0.25	-	-	-	LDICT	ADICT
Choudhury et al. [58]	CFRP_N	150	300	29.39	-	0.72	0.003	230	4900	0.12	1	43.87	0.17	-	-	-	LDICT	ADICT
Choudhury et al. [58]	CFRP_N	150	300	35.21	-	0.72	0.003	230	4900	0.12	1	47.33	0.18	-	-	-	LDICT	ADICT
Choudhury et al. [58]	CFRP_N	200	400	32.59	-	0.54	0.002	230	4900	0.12	1	38.98	0.13	-	-	-	LDICT	ADICT
Issa [59]	CFRP_N	150	300	23.70	-	0.74	0.003	231	4100	0.12	1	39.34	-	-	-	-	LSG	ASG
Issa [59]	CFRP_N	150	300	23.90	-	0.74	0.003	231	4100	0.12	1	39.83	-	-	-	-	LSG	ASG
Issa [59]	CFRP_N	150	300	23.60	-	0.74	0.003	231	4100	0.12	1	41.79	-	-	-	-	LSG	ASG
Issa and Karam [60]	CFRP_N	150	300	30.50	-	0.75	0.003	230	4100	0.12	1	35.80	-	-	-	-	LSG	ASG
Issa and Karam [60]	CFRP_N	150	300	30.50	-	0.75	0.003	230	4100	0.12	1	37.60	-	-	-	-	LSG	ASG
Issa and Karam [60]	CFRP_N	150	300	30.50	-	0.75	0.003	230	4100	0.12	1	42.00	-	-	-	-	LSG	ASG
Issa and Karam [60]	CFRP_N	150	300	30.50	-	1.50	0.007	230	4100	0.24	2	48.70	-	-	-	-	LSG	ASG
Issa and Karam [60]	CFRP_N	150	300	30.50	-	1.50	0.007	230	4100	0.24	2	50.00	-	-	-	-	LSG	ASG
Issa and Karam [60]	CFRP_N	150	300	30.50	-	1.50	0.007	230	4100	0.24	2	64.50	-	-	-	-	LSG	ASG

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Issa and Karam [60]	CFRP_N	150	300	30.50	-	2.25	0.010	230	4100	0.37	3	68.70	-	-	-	-	LSG	ASG
Issa and Karam [60]	CFRP_N	150	300	30.50	-	2.25	0.010	230	4100	0.37	3	64.60	-	-	-	-	LSG	ASG
Issa and Karam [60]	CFRP_N	150	300	30.50	-	2.25	0.010	230	4100	0.37	3	75.60	-	-	-	-	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	38.00	0.22	4.33	0.018	241	2500	0.68	2	110.10	2.55	0.977	-	0.941	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	38.00	0.22	4.33	0.018	241	2500	0.68	2	107.40	2.61	0.965	-	0.929	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	38.00	0.22	6.50	0.027	241	2500	1.02	3	129.00	2.79	0.892	-	0.859	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	38.00	0.22	6.50	0.027	241	2500	1.02	3	135.70	3.08	0.927	-	0.893	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	38.00	0.22	8.69	0.036	241	2500	1.36	4	161.30	3.70	0.872	-	0.840	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	38.00	0.22	8.69	0.036	241	2500	1.36	4	158.50	3.54	0.877	-	0.844	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	37.70	0.28	0.75	0.003	260	2500	0.11	1	48.50	0.90	0.935	-	0.972	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	37.70	0.28	0.75	0.003	260	2500	0.11	1	50.30	0.91	1.092	-	1.136	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	44.20	0.26	0.75	0.003	260	2500	0.11	1	48.10	0.69	0.734	-	0.763	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	44.20	0.26	0.75	0.003	260	2500	0.11	1	51.10	0.89	0.969	-	1.008	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	44.20	0.26	1.51	0.006	260	2500	0.22	2	65.70	1.30	1.184	-	1.231	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	44.20	0.26	1.51	0.006	260	2500	0.22	2	62.90	1.03	0.938	-	0.976	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	47.60	0.28	2.18	0.009	251	2500	0.33	3	82.70	1.30	0.902	-	0.904	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	47.60	0.28	2.18	0.009	251	2500	0.33	3	85.50	1.94	1.130	-	1.132	LSG	ASG
Jiang and Teng [61]	CFRP_N	152	305	47.60	0.28	2.18	0.009	251	2500	0.33	3	85.50	1.82	1.064	-	1.066	LSG	ASG
Jiang et al. [62]	CFRP_N	150	300	28.38	0.24	1.09	0.004	245	3922	0.17	1	56.60	2.34	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	28.38	0.24	1.09	0.004	245	3922	0.17	1	55.60	2.45	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	28.38	0.24	2.19	0.009	245	3922	0.33	2	86.27	3.62	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	28.38	0.24	2.19	0.009	245	3922	0.33	2	85.59	3.57	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	28.38	0.24	3.28	0.013	245	3922	0.50	3	117.16	4.55	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	28.38	0.24	3.28	0.013	245	3922	0.50	3	118.57	4.82	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	29.88	0.22	1.09	0.004	245	3922	0.17	1	56.78	2.26	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	29.88	0.22	1.09	0.004	245	3922	0.17	1	50.77	1.66	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	29.88	0.22	2.19	0.009	245	3922	0.33	2	86.78	3.43	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	29.88	0.22	2.19	0.009	245	3922	0.33	2	89.38	3.62	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	29.88	0.22	3.28	0.013	245	3922	0.50	3	116.25	4.50	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	29.88	0.22	3.28	0.013	245	3922	0.50	3	108.90	4.07	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	28.36	0.23	1.09	0.004	245	3922	0.17	1	51.47	1.60	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	28.36	0.23	1.09	0.004	245	3922	0.17	1	55.45	1.84	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	28.36	0.23	2.19	0.009	245	3922	0.33	2	82.02	2.80	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	28.36	0.23	2.19	0.009	245	3922	0.33	2	83.61	3.06	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	28.36	0.23	3.28	0.013	245	3922	0.50	3	111.33	4.12	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	28.36	0.23	3.28	0.013	245	3922	0.50	3	109.92	3.77	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	38.58	0.20	1.09	0.004	245	3922	0.17	1	67.04	1.64	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	38.58	0.20	1.09	0.004	245	3922	0.17	1	66.61	1.57	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	38.58	0.20	2.19	0.009	245	3922	0.33	2	102.50	2.63	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	38.58	0.20	2.19	0.009	245	3922	0.33	2	100.75	2.72	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	38.58	0.20	3.28	0.013	245	3922	0.50	3	130.62	3.39	-	-	-	N/A	ADICT
Jiang et al. [62]	CFRP_N	150	300	38.58	0.20	3.28	0.013	245	3922	0.50	3	132.48	3.62	-	-	-	N/A	ADICT
Karabinis and Rousakis [63]	CFRP_N	200	320	38.50	0.28	0.56	0.002	240	3720	0.12	1	43.00	0.80	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	38.50	0.28	0.56	0.002	240	3720	0.12	1	41.60	0.71	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	38.50	0.28	0.56	0.002	240	3720	0.12	1	46.00	0.35	-	-	-	N/A	ADM

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions		Hoop-Rupture-Strain Factors			Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Karabinis and Rousakis [63]	CFRP_N	200	320	38.50	0.28	1.12	0.005	240	3720	0.23	2	51.50	0.88	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	38.50	0.28	1.12	0.005	240	3720	0.23	2	50.00	0.58	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	38.50	0.28	1.12	0.005	240	3720	0.23	2	55.00	0.86	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	38.50	0.28	1.69	0.007	240	3720	0.35	3	67.00	1.76	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	38.50	0.28	0.56	0.002	240	3720	0.12	1	42.50	0.86	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	38.50	0.28	0.56	0.002	240	3720	0.12	1	42.00	1.24	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	35.70	0.19	0.56	0.002	240	3720	0.12	1	41.00	0.30	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	35.70	0.19	1.12	0.005	240	3720	0.23	2	50.00	0.60	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	35.70	0.19	1.12	0.005	240	3720	0.23	2	48.50	1.04	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	35.70	0.19	1.12	0.005	240	3720	0.23	2	50.00	1.07	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	35.70	0.19	1.69	0.007	240	3720	0.35	3	63.00	1.72	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	35.70	0.19	1.69	0.007	240	3720	0.35	3	67.50	1.71	-	-	-	N/A	ADM
Karabinis and Rousakis [63]	CFRP_N	200	320	35.70	0.19	1.69	0.007	240	3720	0.35	3	65.50	1.69	-	-	-	N/A	ADM
Karam and Tabbara [64]	CFRP_N	150	300	12.80	0.47	0.74	0.003	231	3650	0.12	1	17.80	1.37	-	-	-	N/A	ADF
Karam and Tabbara [64]	CFRP_N	150	300	12.80	0.47	1.48	0.006	231	3650	0.24	2	31.80	2.78	-	-	-	N/A	ADF
Karbhari and Gao [65]	CFRP_N	152	305	38.40	-	2.41	0.017	138	1047	0.66	2	59.70	1.30	-	-	-	N/A	ADF
Karbhari and Gao [65]	CFRP_N	152	305	38.40	-	2.03	0.026	77	1105	0.99	3	77.70	2.20	-	-	-	N/A	ADF
Karbhari and Gao [65]	CFRP_N	152	305	38.40	-	3.35	0.035	96	1352	1.32	4	89.50	2.40	-	-	-	N/A	ADF
Kono et al. [66]	CFRP_N	100	200	34.30	-	1.57	0.007	235	3820	0.17	1	57.40	0.79	0.840	-	0.517	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	34.30	-	1.57	0.007	235	3820	0.17	1	64.90	1.11	0.920	-	0.566	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	32.30	-	1.57	0.007	235	3820	0.17	1	58.20	-	-	-	-	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	32.30	-	1.57	0.007	235	3820	0.17	1	61.80	1.07	0.960	-	0.591	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	32.30	-	1.57	0.007	235	3820	0.17	1	57.70	1.07	0.630	-	0.388	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	32.30	-	3.15	0.013	235	3820	0.33	2	80.20	1.75	0.890	-	0.548	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	32.30	-	4.73	0.020	235	3820	0.50	3	86.90	1.65	0.770	-	0.474	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	32.30	-	4.73	0.020	235	3820	0.50	3	90.10	1.59	0.670	-	0.412	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	34.80	-	1.57	0.007	235	3820	0.17	1	57.80	0.94	0.910	-	0.560	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	34.80	-	1.57	0.007	235	3820	0.17	1	55.60	1.05	0.890	-	0.548	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	34.80	-	1.57	0.007	235	3820	0.17	1	50.70	0.98	0.610	-	0.375	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	34.80	-	3.15	0.013	235	3820	0.33	2	82.70	2.06	0.660	-	0.406	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	34.80	-	3.15	0.013	235	3820	0.33	2	81.40	-	0.880	-	0.541	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	34.80	-	4.73	0.020	235	3820	0.50	3	103.30	2.36	0.910	-	0.560	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	34.80	-	4.73	0.020	235	3820	0.50	3	110.10	2.49	0.800	-	0.492	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	32.30	-	1.60	0.007	235	3820	0.17	1	59.20	-	-	-	-	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	32.30	-	4.72	0.020	235	3820	0.50	3	88.50	-	-	-	-	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	34.30	-	1.60	0.007	235	3820	0.17	1	61.20	-	-	-	-	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	34.80	-	1.60	0.007	235	3820	0.17	1	54.70	-	-	-	-	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	34.80	-	3.11	0.013	235	3820	0.33	2	82.10	-	-	-	-	N/A	N/A
Kono et al. [66]	CFRP_N	100	200	34.80	-	4.72	0.020	235	3820	0.50	3	106.70	-	-	-	-	N/A	N/A
Lam and Teng [67]	CFRP_N	152	305	35.90	0.20	1.09	0.004	251	2500	0.17	1	50.40	1.27	1.147	0.755	-	LSG	ASG
Lam and Teng [67]	CFRP_N	152	305	35.90	0.20	1.09	0.004	251	2500	0.17	1	47.20	1.11	0.969	0.638	-	LSG	ASG
Lam and Teng [67]	CFRP_N	152	305	35.90	0.20	1.09	0.004	251	2500	0.17	1	53.20	1.29	0.981	0.645	-	LSG	ASG
Lam and Teng [67]	CFRP_N	152	305	35.90	0.20	2.18	0.009	251	2500	0.33	2	68.70	1.68	0.988	0.650	-	LSG	ASG

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Lam and Teng [67]	CFRP_N	152	305	35.90	0.20	2.18	0.009	251	2500	0.33	2	69.90	1.96	1.001	0.659	-	LSG	ASG
Lam and Teng [67]	CFRP_N	152	305	35.90	0.20	2.18	0.009	251	2500	0.33	2	71.60	1.85	0.949	0.624	-	LSG	ASG
Lam and Teng [67]	CFRP_N	152	305	34.30	0.19	3.27	0.013	251	2500	0.50	3	82.60	2.05	0.799	0.526	-	LSG	ASG
Lam and Teng [67]	CFRP_N	152	305	34.30	0.19	3.27	0.013	251	2500	0.50	3	90.40	2.41	0.884	0.582	-	LSG	ASG
Lam and Teng [67]	CFRP_N	152	305	34.30	0.19	3.27	0.013	251	2500	0.50	3	97.30	2.52	0.968	0.637	-	LSG	ASG
Lam and Teng [67]	CFRP_N	152	305	34.30	0.19	1.09	0.004	251	2500	0.17	1	50.30	1.02	0.908	0.597	-	LSG	ASG
Lam and Teng [67]	CFRP_N	152	305	34.30	0.19	1.09	0.004	251	2500	0.17	1	50.00	1.08	0.890	0.586	-	LSG	ASG
Lam and Teng [67]	CFRP_N	152	305	34.30	0.19	1.09	0.004	251	2500	0.17	1	56.70	1.17	0.927	0.610	-	LSG	ASG
Lam et al. [68]	CFRP_N	153	305	41.10	0.26	1.09	0.004	251	2500	0.17	1	52.60	0.90	0.810	0.533	-	LSG	ADM
Lam et al. [68]	CFRP_N	153	305	41.10	0.26	1.09	0.004	251	2500	0.17	1	57.00	1.21	1.080	0.711	-	LSG	ADM
Lam et al. [68]	CFRP_N	153	305	41.10	0.26	1.09	0.004	251	2500	0.17	1	55.40	1.11	1.070	0.704	-	LSG	ADM
Lam et al. [68]	CFRP_N	153	305	38.90	0.25	2.17	0.009	251	2500	0.33	2	76.80	1.91	1.060	0.697	-	LSG	ADM
Lam et al. [68]	CFRP_N	153	305	38.90	0.25	2.17	0.009	251	2500	0.33	2	79.10	2.08	1.130	0.743	-	LSG	ADM
Lam et al. [68]	CFRP_N	153	305	38.90	0.25	2.17	0.009	251	2500	0.33	2	65.80	1.25	0.790	0.520	-	LSG	ADM
Lee et al. [69]	CFRP_N	150	300	36.20	0.24	0.73	0.003	250	4510	0.11	1	41.70	1.00	-	-	-	LDL	ADM
Lee et al. [69]	CFRP_N	150	300	36.20	0.24	1.47	0.006	250	4510	0.22	2	57.80	1.50	-	-	-	LDL	ADM
Lee et al. [69]	CFRP_N	150	300	36.20	0.24	2.20	0.009	250	4510	0.33	3	69.10	2.00	-	-	-	LDL	ADM
Lee et al. [69]	CFRP_N	150	300	36.20	0.24	2.94	0.012	250	4510	0.44	4	85.40	2.70	-	-	-	LDL	ADM
Lee et al. [69]	CFRP_N	150	300	36.20	0.24	3.68	0.015	250	4510	0.55	5	104.30	3.10	-	-	-	LDL	ADM
Li et al. [70]	CFRP_N	300	600	16.68	-	0.34	0.001	231	4120	0.11	1	25.52	-	-	-	-	N/A	ADF
Li et al. [70]	CFRP_N	300	600	16.68	-	0.68	0.003	231	4120	0.22	2	33.64	-	-	-	-	N/A	ADF
Li, Wu and Gravina [71]	CFRP_N	150	300	25.50	0.21	1.08	0.004	242	4338	0.17	1	54.40	2.60	-	-	-	LDICT	ADICT
Li, Wu and Gravina [71]	CFRP_N	150	300	25.50	0.21	1.08	0.004	242	4338	0.17	1	55.60	2.70	-	-	-	LDICT	ADICT
Li, Wu and Gravina [71]	CFRP_N	150	300	37.70	0.23	1.08	0.004	242	4338	0.17	1	68.80	1.76	-	-	-	LDICT	ADICT
Li, Wu and Gravina [71]	CFRP_N	150	300	37.70	0.23	1.08	0.004	242	4338	0.17	1	71.30	1.96	-	-	-	LDICT	ADICT
Li, Wu and Gravina [71]	CFRP_N	150	300	49.60	0.25	1.08	0.004	242	4338	0.17	1	64.00	1.45	-	-	-	LDICT	ADICT
Li, Wu and Gravina [71]	CFRP_N	150	300	49.60	0.25	1.08	0.004	242	4338	0.17	1	69.10	1.50	-	-	-	LDICT	ADICT
Liang et al. [72]	CFRP_N	100	200	25.90	0.24	1.64	0.007	245	3248	0.17	1	64.30	2.31	1.480	1.000	-	LSG	ASG
Liang et al. [72]	CFRP_N	100	200	25.90	0.24	1.64	0.007	245	3248	0.17	1	63.00	1.93	1.070	0.723	-	LSG	ASG
Liang et al. [72]	CFRP_N	100	200	25.90	0.24	1.64	0.007	245	3248	0.17	1	66.40	2.16	1.390	0.939	-	LSG	ASG
Liang et al. [72]	CFRP_N	100	200	25.90	0.24	1.64	0.007	245	3248	0.17	1	64.80	2.16	1.220	0.824	-	LSG	ASG
Liang et al. [72]	CFRP_N	200	400	22.70	0.22	1.64	0.007	245	3248	0.33	2	64.30	2.29	1.090	0.736	-	LSG	ASG
Liang et al. [72]	CFRP_N	200	400	22.70	0.22	1.64	0.007	245	3248	0.33	2	69.10	2.37	1.120	0.757	-	LSG	ASG
Liang et al. [72]	CFRP_N	200	400	22.70	0.22	1.64	0.007	245	3248	0.33	2	60.10	2.00	0.890	0.601	-	LSG	ASG
Liang et al. [72]	CFRP_N	200	400	22.70	0.22	1.64	0.007	245	3248	0.33	2	66.30	2.48	1.160	0.784	-	LSG	ASG
Liang et al. [72]	CFRP_N	300	600	24.50	0.22	1.64	0.007	245	3248	0.50	3	58.80	1.84	0.980	0.662	-	LSG	ASG
Liang et al. [72]	CFRP_N	300	600	24.50	0.22	1.64	0.007	245	3248	0.50	3	59.40	1.71	1.330	0.899	-	LSG	ASG
Liang et al. [72]	CFRP_N	300	600	24.50	0.22	1.64	0.007	245	3248	0.50	3	63.00	2.27	1.700	1.149	-	LSG	ASG
Liang et al. [72]	CFRP_N	300	600	24.50	0.22	1.64	0.007	245	3248	0.50	3	60.60	2.09	1.220	0.824	-	LSG	ASG
Lin and Li [73]	CFRP_N	150	300	18.30	-	0.85	0.004	232	4170	0.14	1	38.62	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	120	240	17.70	-	1.07	0.005	232	4170	0.14	1	43.62	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	100	200	17.90	-	1.28	0.006	232	4170	0.14	1	46.08	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	150	300	18.30	-	1.70	0.007	232	4170	0.28	2	55.74	-	-	-	-	LSG	ADF

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Lin and Li [73]	CFRP_N	120	240	17.70	-	2.13	0.009	232	4170	0.28	2	63.47	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	100	200	17.90	-	2.56	0.011	232	4170	0.28	2	71.46	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	150	300	18.30	-	2.56	0.011	232	4170	0.41	3	73.57	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	120	240	17.70	-	3.20	0.014	232	4170	0.41	3	85.61	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	100	200	17.90	-	3.85	0.017	232	4170	0.41	3	93.33	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	150	300	23.20	-	0.85	0.004	232	4170	0.14	1	45.41	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	120	240	23.20	-	1.07	0.005	232	4170	0.14	1	49.11	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	100	200	23.50	-	1.28	0.006	232	4170	0.14	1	57.37	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	150	300	23.20	-	1.70	0.007	232	4170	0.28	2	61.98	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	120	240	23.20	-	2.13	0.009	232	4170	0.28	2	76.90	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	100	200	23.50	-	2.56	0.011	232	4170	0.28	2	81.91	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	150	300	23.20	-	2.56	0.011	232	4170	0.41	3	84.46	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	120	240	23.20	-	3.20	0.014	232	4170	0.41	3	91.17	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	100	200	23.50	-	3.85	0.017	232	4170	0.41	3	103.77	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	150	300	25.50	-	0.85	0.004	232	4170	0.14	1	49.02	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	120	240	25.90	-	1.07	0.005	232	4170	0.14	1	56.40	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	100	200	25.50	-	1.28	0.006	232	4170	0.14	1	62.26	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	150	300	25.50	-	1.70	0.007	232	4170	0.28	2	69.82	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	120	240	25.90	-	2.13	0.009	232	4170	0.28	2	81.29	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	100	200	25.50	-	2.56	0.011	232	4170	0.28	2	90.54	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	150	300	25.50	-	2.56	0.011	232	4170	0.41	3	88.73	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	120	240	25.90	-	3.20	0.014	232	4170	0.41	3	98.73	-	-	-	-	LSG	ADF
Lin and Li [73]	CFRP_N	100	200	25.50	-	3.85	0.017	232	4170	0.41	3	109.48	-	-	-	-	LSG	ADF
Lin and Liao [74]	CFRP_N	100	200	23.90	-	1.79	0.075	24	455	1.84	1	62.42	-	-	-	-	N/A	N/A
Lin and Liao [74]	CFRP_N	100	200	23.90	-	1.79	0.075	24	455	1.84	1	62.06	-	-	-	-	N/A	N/A
Lin and Liao [74]	CFRP_N	100	200	23.90	-	1.79	0.075	24	455	1.84	1	61.45	-	-	-	-	N/A	N/A
Lin and Liao [74]	CFRP_N	100	200	23.90	-	3.63	0.162	22	403	3.89	2	93.56	-	-	-	-	N/A	N/A
Lin and Liao [74]	CFRP_N	100	200	23.90	-	3.63	0.162	22	403	3.89	2	90.69	-	-	-	-	N/A	N/A
Lin and Liao [74]	CFRP_N	100	200	23.90	-	3.63	0.162	22	403	3.89	2	88.98	-	-	-	-	N/A	N/A
Mandal et al. [31]	CFRP_N	102	200	30.70	0.27	1.49	0.032	47	784	0.80	1	73.80	3.08	-	-	-	LSG	ASG
Mandal et al. [31]	CFRP_N	102	200	46.30	0.23	1.49	0.032	47	784	0.80	1	77.10	1.84	-	-	-	LSG	ASG
Mandal et al. [31]	CFRP_N	102	200	54.50	0.24	1.49	0.032	47	784	0.80	1	72.10	0.80	-	-	-	LSG	ASG
Matthys et al. [75]	CFRP_N	150	300	34.90	0.21	0.75	0.003	240	2600	0.12	1	47.30	0.92	1.290	-	0.872	LSG	ASG
Micelli et al. [27]	CFRP_N	102	204	37.00	-	1.43	0.006	227	3790	0.16	1	60.00	1.02	1.200	-	0.719	LSG	ASG
Matthys et al. [75]	CFRP_N	150	300	34.90	-	0.75	0.003	240	2600	0.12	1	44.90	0.88	1.230	-	0.831	LSG	ASG
Matthys et al. [75]	CFRP_N	150	300	34.90	-	0.75	0.003	240	2600	0.12	1	40.70	0.76	0.930	-	0.628	LSG	ASG
Miyauchi et al. [76]	CFRP_N	150	300	31.20	0.20	0.68	0.003	231	3481	0.11	1	52.40	1.21	-	-	-	N/A	N/A
Miyauchi et al. [76]	CFRP_N	150	300	31.20	0.20	1.35	0.006	231	3481	0.22	2	67.40	1.55	-	-	-	N/A	N/A
Miyauchi et al. [76]	CFRP_N	150	300	31.20	0.20	2.03	0.009	231	3481	0.33	3	81.70	2.01	-	-	-	N/A	N/A
Miyauchi et al. [76]	CFRP_N	100	200	33.70	0.19	1.02	0.004	231	3481	0.11	1	69.60	1.41	-	-	-	N/A	N/A
Miyauchi et al. [76]	CFRP_N	100	200	33.70	0.19	2.03	0.009	231	3481	0.22	2	88.00	1.49	-	-	-	N/A	N/A
Miyauchi et al. [76]	CFRP_N	100	200	33.70	0.19	3.05	0.013	231	3481	0.33	3	109.90	1.90	-	-	-	N/A	N/A

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Miyauchi et al. [76]	CFRP_N	150	300	45.20	0.22	0.68	0.003	231	3481	0.11	1	59.40	0.95	-	-	-	N/A	N/A
Miyauchi et al. [76]	CFRP_N	150	300	45.20	0.22	1.35	0.006	231	3481	0.22	2	79.40	1.25	-	-	-	N/A	N/A
Miyauchi et al. [76]	CFRP_N	100	200	51.90	0.19	1.02	0.004	231	3481	0.11	1	75.20	0.96	-	-	-	N/A	N/A
Miyauchi et al. [76]	CFRP_N	100	200	51.90	0.19	2.03	0.009	231	3481	0.22	2	104.60	1.28	-	-	-	N/A	N/A
Miyauchi et al. [77]	CFRP_N	150	300	23.60	0.18	0.68	0.003	231	3481	0.11	1	36.50	1.59	-	-	-	N/A	ASG
Miyauchi et al. [77]	CFRP_N	150	300	23.60	0.18	1.35	0.006	231	3481	0.22	2	50.80	2.38	-	-	-	N/A	ASG
Miyauchi et al. [77]	CFRP_N	150	300	23.60	0.18	2.03	0.009	231	3481	0.33	3	64.30	-	-	-	-	N/A	ASG
Miyauchi et al. [77]	CFRP_N	100	200	26.30	0.19	1.02	0.004	231	3481	0.11	1	50.70	1.99	-	-	-	N/A	ASG
Miyauchi et al. [77]	CFRP_N	100	200	26.30	0.19	2.03	0.009	231	3481	0.22	2	70.90	2.36	-	-	-	N/A	ASG
Miyauchi et al. [77]	CFRP_N	100	200	26.30	0.19	3.05	0.013	231	3481	0.33	3	84.90	-	-	-	-	N/A	ASG
Modarelli et al. [78]	CFRP_N	150	300	28.35	0.49	0.97	0.004	221	3070	0.17	1	55.25	2.20	1.530	-	0.890	LSG	ADF
Modarelli et al. [78]	CFRP_N	150	300	38.24	0.63	0.97	0.004	221	3070	0.17	1	62.73	1.49	1.320	-	0.768	LSG	ADF
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	17.60	-	0.78	0.003	230	3910	0.13	1	34.81	2.46	1.519	-	0.894	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	17.60	-	0.78	0.003	230	3910	0.13	1	39.69	2.02	1.519	-	0.894	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	17.60	-	0.78	0.003	230	3910	0.13	1	36.37	2.31	1.443	-	0.849	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	17.60	-	0.78	0.003	230	3910	0.13	1	37.42	1.89	1.290	-	0.759	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	18.85	-	0.78	0.003	230	3910	0.13	1	41.98	2.02	1.537	-	0.904	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	18.85	-	0.78	0.003	230	3910	0.13	1	42.26	2.13	1.553	-	0.914	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	19.30	-	0.78	0.003	230	3910	0.13	1	41.43	-	1.488	-	0.875	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	19.70	-	0.78	0.003	230	3910	0.13	1	39.60	1.77	1.340	-	0.788	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	19.70	-	0.78	0.003	230	3910	0.13	1	36.89	1.67	1.491	-	0.877	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	19.70	-	1.10	0.005	242	2546	0.17	1	39.66	1.32	1.143	-	1.086	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	19.30	-	1.10	0.005	242	2546	0.17	1	38.62	1.58	1.062	-	1.009	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	20.00	-	0.78	0.003	230	3910	0.13	1	41.12	1.96	1.463	-	0.861	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	19.70	-	1.56	0.007	230	3910	0.26	2	58.82	2.51	1.618	-	0.952	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	152	305	19.70	-	1.56	0.007	230	3910	0.26	2	56.25	2.81	1.471	-	0.865	LSG	ASG
Moretti and Arvanitopoulos [79]	CFRP_N	100	200	19.30	-	1.19	0.005	230	3910	0.13	1	51.88	1.78	1.458	-	0.858	LSG	ASG
Ongpeng [29]	CFRP_N	180	500	27.00	-	0.67	0.003	231	3650	0.13	1	37.23	-	-	-	-	N/A	N/A
Ongpeng [29]	CFRP_N	180	500	27.00	-	1.34	0.006	231	3650	0.26	2	51.18	-	-	-	-	N/A	N/A
Owen [80]	CFRP_N	102	203	53.00	-	1.70	0.006	262	4200	0.17	1	70.50	1.00	1.230	0.697	0.767	N/A	N/A
Owen [80]	CFRP_N	102	203	53.00	-	3.40	0.013	262	4200	0.33	2	108.80	1.82	1.530	0.867	0.954	N/A	N/A
Owen [80]	CFRP_N	102	203	53.00	-	6.83	0.026	262	4200	0.66	4	149.00	2.32	1.330	0.754	0.830	N/A	N/A
Owen [80]	CFRP_N	102	203	53.00	-	10.27	0.039	262	4200	0.99	6	197.40	3.30	1.230	0.697	0.767	N/A	N/A
Owen [80]	CFRP_N	102	203	53.00	-	13.74	0.052	262	4200	1.32	8	259.00	4.17	1.300	0.737	0.811	N/A	N/A
Owen [80]	CFRP_N	152	305	47.90	-	9.18	0.035	262	4200	1.32	1	65.40	0.90	1.280	0.725	0.798	N/A	N/A
Owen [80]	CFRP_N	152	305	47.90	-	9.18	0.035	262	4200	1.32	2	96.20	1.69	1.400	0.793	0.873	N/A	N/A
Owen [80]	CFRP_N	152	305	47.90	-	9.18	0.035	262	4200	1.32	4	121.10	2.04	1.280	0.725	0.798	N/A	N/A
Pessiki et al. [81]	CFRP_N	152	610	26.20	-	1.01	0.026	38	580	1.00	1	50.60	1.44	0.810	0.540	-	LSG	ADF
Pessiki et al. [81]	CFRP_N	152	610	26.20	-	2.03	0.053	38	580	2.00	2	64.00	1.65	0.720	0.480	-	LSG	ADF
Picher et al. [82]	CFRP_N	152	304	39.70	-	1.98	0.024	83	1266	0.90	2	56.00	1.07	0.840	0.551	0.568	N/A	N/A
Piekarczyk et al. [83]	CFRP_N	47	112	55.00	0.70	8.02	0.071	113	1420	0.82	2	189.00	2.80	-	-	-	N/A	N/A
Piekarczyk et al. [83]	CFRP_N	47	112	55.00	0.70	4.83	0.044	110	1150	0.51	2	120.00	2.00	-	-	-	N/A	N/A

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Purba and Mufti [84]	CFRP_N	191	788	27.10	-	1.07	0.005	231	3483	0.22	2	53.90	0.58	0.670	-	0.444	LSG	ASG
Rochette and Labossiére [85]	CFRP_N	100	200	42.00	-	2.00	0.024	83	1265	0.60	2	73.50	1.60	0.890	0.582	0.000	LSG	ADF
Rochette and Labossiére [85]	CFRP_N	100	200	42.00	-	2.00	0.024	83	1265	0.60	2	73.50	1.57	0.950	0.621	0.000	LSG	ADF
Rochette and Labossiére [85]	CFRP_N	100	200	42.00	-	2.00	0.024	83	1265	0.60	2	67.60	1.35	0.800	0.523	0.000	LSG	ADF
Rousakis et al. [86]	CFRP_N	150	300	20.40	0.26	1.06	0.005	234	4493	0.17	1	41.30	0.96	0.800	-	0.417	LSG	ASG
Rousakis et al. [86]	CFRP_N	150	300	20.40	0.26	2.13	0.009	234	4493	0.34	2	57.20	1.42	1.020	-	0.531	LSG	ASG
Rousakis et al. [86]	CFRP_N	150	300	20.40	0.26	3.19	0.014	234	4493	0.51	3	63.10	1.42	0.580	-	0.302	LSG	ASG
Rousakis et al. [86]	CFRP_N	150	300	49.20	0.17	1.06	0.005	234	4493	0.17	1	79.00	0.39	0.440	-	0.229	LSG	ASG
Rousakis et al. [86]	CFRP_N	150	300	49.20	0.17	2.13	0.009	234	4493	0.34	2	83.90	0.35	-	-	-	LSG	ASG
Rousakis et al. [86]	CFRP_N	150	300	49.20	0.17	3.19	0.014	234	4493	0.51	3	100.60	0.62	-	-	-	LSG	ASG
Saenz and Pantelides [87]	CFRP_N	152	304	41.80	-	2.30	0.026	87	1220	1.00	1	83.70	1.18	0.920	0.655	-	LSG	ADM
Saenz and Pantelides [87]	CFRP_N	152	304	47.50	-	2.30	0.026	87	1220	1.00	1	81.50	0.88	0.930	0.662	-	LSG	ADM
Saenz and Pantelides [87]	CFRP_N	152	304	40.30	-	4.63	0.053	87	1220	2.00	2	108.10	2.04	0.920	0.655	-	LSG	ADM
Saenz and Pantelides [87]	CFRP_N	152	304	41.70	-	4.63	0.053	87	1220	2.00	2	109.50	1.76	1.080	0.768	-	LSG	ADM
Santarosa et al. [88]	CFRP_N	150	300	28.10	-	0.68	0.003	230	3400	0.11	1	38.60	-	-	-	-	LSG	ASG
Santarosa et al. [88]	CFRP_N	150	300	15.30	-	0.68	0.003	230	3400	0.11	1	33.60	0.45	-	-	-	LSG	ASG
Santarosa et al. [88]	CFRP_N	150	300	15.30	-	1.35	0.006	230	3400	0.22	2	46.70	1.30	-	-	-	LSG	ASG
Shahawy et al. [89]	CFRP_N	153	305	19.40	0.33	0.78	0.009	83	2275	0.36	1	33.80	1.59	-	-	-	LSG	ASG
Shahawy et al. [89]	CFRP_N	153	305	19.40	0.33	1.26	0.015	83	2275	0.58	2	46.40	2.21	-	-	-	LSG	ASG
Shahawy et al. [89]	CFRP_N	153	305	19.40	0.33	1.77	0.021	83	2275	0.81	3	62.60	2.58	-	-	-	LSG	ASG
Shahawy et al. [89]	CFRP_N	153	305	19.40	0.33	2.25	0.027	83	2275	1.03	4	75.70	3.56	-	-	-	LSG	ASG
Shahawy et al. [89]	CFRP_N	153	305	19.40	0.33	2.73	0.033	83	2275	1.25	5	80.20	3.42	-	-	-	LSG	ASG
Shahawy et al. [89]	CFRP_N	153	305	49.00	0.29	0.78	0.009	83	2275	0.36	1	59.10	0.62	-	-	-	LSG	ASG
Shahawy et al. [89]	CFRP_N	153	305	49.00	0.29	1.26	0.015	83	2275	0.58	2	76.50	0.97	-	-	-	LSG	ASG
Shahawy et al. [89]	CFRP_N	153	305	49.00	0.29	1.77	0.021	83	2275	0.81	3	98.80	1.26	-	-	-	LSG	ASG
Shahawy et al. [89]	CFRP_N	153	305	49.00	0.29	2.25	0.027	83	2275	1.03	4	112.70	1.90	-	-	-	LSG	ASG
Shehata et al. [90]	CFRP_N	150	300	29.80	0.21	1.04	0.004	235	3550	0.17	1	57.00	1.23	1.230	-	0.814	LSG	ASG
Shehata et al. [90]	CFRP_N	150	300	29.80	0.21	2.07	0.009	235	3550	0.33	2	72.10	1.74	1.190	-	0.788	LSG	ASG
Shehata et al. [90]	CFRP_N	150	300	25.60	-	1.04	0.004	235	3550	0.17	1	43.90	-	-	-	-	LSG	ASG
Shehata et al. [90]	CFRP_N	150	300	25.60	-	2.07	0.009	235	3550	0.33	2	59.60	-	-	-	-	LSG	ASG
Shehata et al. [90]	CFRP_N	225	450	34.00	0.20	0.69	0.003	235	3550	0.17	1	43.70	0.62	-	-	-	LSG	ASG
Shehata et al. [90]	CFRP_N	225	450	34.00	0.20	1.38	0.006	235	3550	0.33	2	62.90	1.09	-	-	-	LSG	ASG
Shehata et al. [90]	CFRP_N	150	300	34.00	0.20	1.04	0.004	235	3550	0.17	1	61.20	0.91	-	-	-	LSG	ASG
Shehata et al. [90]	CFRP_N	150	300	34.00	0.20	2.07	0.009	235	3550	0.33	2	82.10	1.10	-	-	-	LSG	ASG
Smith et al. [91]	CFRP_N	250	500	35.00	-	0.88	0.004	211	3182	0.26	2	50.00	-	0.893	0.591	-	LSG	ASG
Smith et al. [91]	CFRP_N	250	500	35.00	-	0.88	0.004	211	3182	0.26	2	57.00	-	1.218	0.806	-	LSG	ASG
Smith et al. [91]	CFRP_N	250	500	35.00	-	0.88	0.004	211	3182	0.26	2	59.00	-	1.311	0.867	-	LSG	ASG
Smith et al. [91]	CFRP_N	250	500	35.00	-	0.88	0.004	211	3182	0.26	2	56.00	-	1.149	0.760	-	LSG	ASG
Song et al. [92]	CFRP_N	100	300	22.40	-	1.23	0.005	237	4073	0.13	1	56.20	0.90	0.874	-	0.509	LSG	ASG
Song et al. [92]	CFRP_N	100	300	22.40	-	2.47	0.010	237	4073	0.26	2	78.20	1.76	0.937	-	0.545	LSG	ASG
Song et al. [92]	CFRP_N	100	300	22.40	-	3.71	0.016	237	4073	0.39	3	118.70	3.31	1.070	-	0.623	LSG	ASG
Song et al. [92]	CFRP_N	150	450	22.40	-	0.82	0.003	237	4073	0.13	1	45.70	1.22	1.117	-	0.650	LSG	ASG
Song et al. [92]	CFRP_N	150	450	22.40	-	1.65	0.007	237	4073	0.26	2	65.40	2.00	1.179	-	0.686	LSG	ASG

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Song et al. [92]	CFRP_N	150	450	22.40	-	2.47	0.010	237	4073	0.39	3	85.00	2.56	1.207	-	0.702	LSG	ASG
Song et al. [92]	CFRP_N	100	300	40.90	-	1.23	0.005	237	4073	0.13	1	71.10	1.98	0.920	-	0.535	LSG	ASG
Song et al. [92]	CFRP_N	100	300	40.90	-	2.47	0.010	237	4073	0.26	2	97.60	1.65	1.039	-	0.605	LSG	ASG
Song et al. [92]	CFRP_N	100	300	40.90	-	3.71	0.016	237	4073	0.39	3	125.00	2.18	1.030	-	0.599	LSG	ASG
Song et al. [92]	CFRP_N	150	450	40.90	-	0.82	0.003	237	4073	0.13	1	57.10	0.87	1.238	-	0.720	LSG	ASG
Song et al. [92]	CFRP_N	150	450	40.90	-	1.65	0.007	237	4073	0.26	2	78.40	1.42	1.074	-	0.625	LSG	ASG
Song et al. [92]	CFRP_N	150	450	40.90	-	2.47	0.010	237	4073	0.39	3	100.40	1.89	1.164	-	0.677	LSG	ASG
Stanton and Owen [93]	CFRP_N	153	305	49.00	-	1.14	0.004	262	4200	0.17	1	68.97	1.00	-	-	-	LSG	ADF
Stanton and Owen [93]	CFRP_N	153	305	49.00	-	2.27	0.009	262	4200	0.33	2	103.45	1.80	-	-	-	LSG	ADF
Stanton and Owen [93]	CFRP_N	153	305	49.00	-	4.14	0.017	238	4200	0.66	4	151.72	2.30	-	-	-	LSG	ADF
Stanton and Owen [93]	CFRP_N	153	305	49.00	-	6.22	0.026	238	4200	0.99	6	213.79	3.70	-	-	-	LSG	ADF
Stanton and Owen [93]	CFRP_N	153	305	49.00	-	8.31	0.035	238	4200	1.32	8	275.86	4.60	-	-	-	LSG	ADF
Suter and Pinzelli [94]	CFRP_N	150	300	44.70	-	1.50	0.006	240	3800	0.23	2	68.31	0.86	-	-	-	N/A	N/A
Tamuzs et al. [95]	CFRP_N	150	300	20.80	0.24	2.10	0.009	231	2390	0.34	2	37.49	1.08	0.316	0.305	0.164	LSG	ASG
Tamuzs et al. [95]	CFRP_N	150	300	20.80	0.24	2.10	0.009	231	2390	0.34	2	42.26	1.32	0.551	0.533	0.287	LSG	ASG
Tamuzs et al. [95]	CFRP_N	150	300	48.80	0.25	2.10	0.009	231	2390	0.34	2	72.08	0.81	0.449	0.434	0.233	LSG	ASG
Tamuzs et al. [95]	CFRP_N	150	300	48.80	0.25	2.10	0.009	231	2390	0.34	2	72.55	0.90	0.373	0.361	0.194	LSG	ASG
Thériault et al. [96]	CFRP_N	51	102	18.00	-	2.99	0.013	230	3481	0.17	1	70.00	-	-	-	-	LSG	ASG
Thériault et al. [96]	CFRP_N	152	304	37.00	-	2.00	0.009	230	3481	0.33	2	64.00	-	-	-	-	LSG	ASG
Thériault et al. [96]	CFRP_N	304	608	37.00	-	2.00	0.009	230	3481	0.66	4	66.00	-	-	-	-	LSG	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	24.00	0.27	0.86	0.025	34	403	1.00	1	47.00	1.69	1.270	0.907	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	24.00	0.27	0.86	0.025	34	403	1.00	1	45.30	1.56	1.270	0.900	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	24.00	0.27	0.86	0.025	34	403	1.00	1	29.50	0.93	1.260	0.365	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	24.00	0.27	1.72	0.051	34	403	2.00	2	55.80	2.41	0.511	0.850	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	24.00	0.27	1.72	0.051	34	403	2.00	2	55.50	2.18	1.190	0.879	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	24.00	0.27	1.72	0.051	34	403	2.00	2	58.00	2.52	1.230	0.893	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	24.00	0.27	2.60	0.076	34	403	3.00	3	77.30	3.20	1.250	0.814	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	24.00	0.27	2.60	0.076	34	403	3.00	3	79.00	3.34	1.140	0.829	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	24.00	0.27	2.60	0.076	34	403	3.00	3	72.90	2.91	1.160	0.771	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	41.60	0.31	0.86	0.025	34	403	1.00	1	49.80	0.99	1.080	0.479	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	41.60	0.31	0.86	0.025	34	403	1.00	1	61.30	1.25	0.670	0.829	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	41.60	0.31	0.86	0.025	34	403	1.00	1	62.90	1.29	1.160	0.864	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	41.60	0.31	1.72	0.051	34	403	2.00	2	73.20	1.57	1.210	0.714	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	41.60	0.31	1.72	0.051	34	403	2.00	2	76.60	1.84	1.000	0.843	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	41.60	0.31	1.72	0.051	34	403	2.00	2	77.00	1.99	1.180	0.850	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	41.60	0.31	2.60	0.076	34	403	3.00	3	96.90	2.52	1.190	0.814	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	41.60	0.31	2.60	0.076	34	403	3.00	3	95.90	2.30	1.140	0.793	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_N	160	320	41.60	0.31	2.60	0.076	34	403	3.00	3	92.70	2.24	1.110	0.771	-	LDL	ASG
Toutanji and Deng [98]	CFRP_N	76	152	30.90	-	2.68	0.012	231	3485	0.22	2	95.00	-	-	-	-	LSG	ASG
Toutanji and Deng [98]	CFRP_N	76	152	31.80	-	3.57	0.030	118	2059	0.57	5	140.90	-	-	-	-	LSG	ASG
Toutanji and Deng [98]	CFRP_N	76	152	31.80	-	0.93	0.013	73	1519	0.24	2	60.80	-	-	-	-	LSG	ASG
Valdmanis et al. [99]	CFRP_N	150	300	40.00	0.17	0.91	0.005	201	1906	0.17	1	66.00	0.63	0.890	0.936	0.463	LSG	ASG
Valdmanis et al. [99]	CFRP_N	150	300	40.00	0.17	2.10	0.009	231	2389	0.34	2	87.20	1.07	0.840	0.812	0.437	LSG	ASG
Valdmanis et al. [99]	CFRP_N	150	300	40.00	0.17	3.22	0.014	236	2661	0.51	3	96.00	1.36	0.690	0.612	0.359	LSG	ASG

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Valdmanis et al. [99]	CFRP_N	150	300	44.30	0.17	0.91	0.005	201	1906	0.17	1	73.30	0.58	0.740	0.778	0.385	LSG	ASG
Valdmanis et al. [99]	CFRP_N	150	300	44.30	0.17	2.10	0.009	231	2389	0.34	2	82.60	0.54	0.430	0.416	0.224	LSG	ASG
Valdmanis et al. [99]	CFRP_N	150	300	44.30	0.17	3.22	0.014	236	2661	0.51	3	115.10	0.94	0.780	0.692	0.406	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_N	152	305	35.50	-	0.74	0.003	240	3800	0.12	1	44.00	0.77	1.200	-	0.758	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_N	152	305	35.50	-	0.74	0.003	240	3800	0.12	1	43.90	0.82	1.100	-	0.695	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_N	152	305	35.50	-	0.74	0.003	240	3800	0.12	1	43.10	0.82	1.100	-	0.695	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_N	152	305	38.00	-	1.48	0.006	240	3800	0.23	2	63.50	1.51	1.170	-	0.739	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_N	152	305	38.00	-	1.48	0.006	240	3800	0.23	2	66.10	1.65	1.170	-	0.739	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_N	152	305	36.10	-	1.48	0.006	240	3800	0.23	2	58.60	1.27	1.110	-	0.701	LSG	ASG
Wang and Cheong [101]	CFRP_N	200	600	27.90	0.16	1.70	0.007	235	4400	0.36	2	82.80	1.52	0.850	-	0.454	LSG	ASG
Wang and Cheong [101]	CFRP_N	200	600	27.90	0.16	1.70	0.007	235	4400	0.36	2	81.20	1.43	1.070	-	0.571	LSG	ASG
Wang and Wu [102]	CFRP_N	150	300	30.90	0.24	0.96	0.004	219	4364	0.17	1	53.80	-	1.240	0.623	-	LSG	ADM
Wang and Wu [102]	CFRP_N	150	300	30.90	0.24	0.96	0.004	219	4364	0.17	1	61.20	-	1.240	0.623	-	LSG	ADM
Wang and Wu [102]	CFRP_N	150	300	30.90	0.24	0.96	0.004	219	4364	0.17	1	52.30	-	1.240	0.623	-	LSG	ADM
Wang and Wu [102]	CFRP_N	150	300	30.90	0.24	1.93	0.009	219	4364	0.33	2	88.20	-	1.320	0.663	-	LSG	ADM
Wang and Wu [102]	CFRP_N	150	300	30.90	0.24	1.93	0.009	219	4364	0.33	2	85.60	-	1.320	0.663	-	LSG	ADM
Wang and Wu [102]	CFRP_N	150	300	30.90	0.24	1.93	0.009	219	4364	0.33	2	80.60	-	1.320	0.663	-	LSG	ADM
Wang and Wu [102]	CFRP_N	150	300	52.10	0.27	0.99	0.004	226	3788	0.17	1	68.00	-	1.570	0.789	-	LSG	ADM
Wang and Wu [102]	CFRP_N	150	300	52.10	0.27	0.99	0.004	226	3788	0.17	1	69.20	-	1.570	0.789	-	LSG	ADM
Wang and Wu [102]	CFRP_N	150	300	52.10	0.27	0.99	0.004	226	3788	0.17	1	66.50	-	1.570	0.789	-	LSG	ADM
Wang and Wu [102]	CFRP_N	150	300	52.10	0.27	1.99	0.009	226	3788	0.33	2	100.00	-	1.560	0.784	-	LSG	ADM
Wang and Wu [102]	CFRP_N	150	300	52.10	0.27	1.99	0.009	226	3788	0.33	2	94.90	-	1.560	0.784	-	LSG	ADM
Wang and Wu [102]	CFRP_N	150	300	52.10	0.27	1.99	0.009	226	3788	0.33	2	103.00	-	1.560	0.784	-	LSG	ADM
Wang et al. [103]	CFRP_N	305	915	24.50	0.20	0.54	0.002	244	4340	0.17	1	35.00	1.85	1.602	-	0.901	LSG	ADM
Wang et al. [103]	CFRP_N	305	915	24.50	0.20	1.06	0.004	244	4340	0.33	2	55.30	3.26	1.615	-	0.908	LSG	ADM
Wang et al. [103]	CFRP_N	204	612	24.50	0.20	0.79	0.003	240	4344	0.17	1	46.10	2.45	1.678	-	0.927	LSG	ADM
Wang et al. [103]	CFRP_N	204	612	24.50	0.20	1.57	0.007	240	4344	0.33	2	65.20	3.66	1.453	-	0.803	LSG	ADM
Watanabe et al. [104]	CFRP_N	100	200	30.20	-	1.50	0.007	225	2716	0.17	1	46.60	1.51	0.940	0.777	0.644	N/A	N/A
Watanabe et al. [104]	CFRP_N	100	200	30.20	-	4.52	0.020	225	2873	0.50	3	87.20	3.11	0.820	0.641	0.561	N/A	N/A
Watanabe et al. [104]	CFRP_N	100	200	30.20	-	6.04	0.027	225	2658	0.67	4	104.60	4.15	0.760	0.642	0.520	N/A	N/A
Wu and Jiang [105]	CFRP_N	150	300	28.70	-	1.13	0.004	254	4192	0.17	1	59.34	2.53	-	-	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	28.70	-	1.13	0.004	254	4192	0.17	1	54.82	2.14	-	-	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	30.10	-	2.27	0.009	254	4192	0.33	2	88.14	3.89	-	-	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	30.10	-	2.27	0.009	254	4192	0.33	2	90.40	3.80	-	-	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	20.60	-	1.08	0.004	242	4441	0.17	1	50.35	-	1.410	0.734	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	20.60	-	1.08	0.004	242	4441	0.17	1	52.95	-	1.560	0.813	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	20.60	-	1.08	0.004	242	4441	0.17	1	53.23	-	1.430	0.745	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	20.60	-	2.16	0.009	242	4441	0.33	2	83.72	-	1.840	0.958	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	20.60	-	2.16	0.009	242	4441	0.33	2	86.55	-	1.860	0.969	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	20.60	-	2.16	0.009	242	4441	0.33	2	88.76	-	2.260	1.177	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	20.60	-	3.24	0.013	242	4441	0.50	3	110.20	-	1.790	0.932	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	20.60	-	3.24	0.013	242	4441	0.50	3	108.11	-	1.370	0.714	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	20.60	-	3.24	0.013	242	4441	0.50	3	109.97	-	1.730	0.901	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	20.60	-	4.33	0.018	242	4441	0.67	4	127.74	-	1.920	1.000	-	LSG	ADM

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Wu and Jiang [105]	CFRP_N	150	300	20.60	-	4.33	0.018	242	4441	0.67	4	132.54	-	1.850	0.964	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	20.60	-	4.33	0.018	242	4441	0.67	4	140.58	-	1.710	0.891	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	24.80	-	1.08	0.004	242	4441	0.17	1	61.66	-	1.810	0.943	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	24.80	-	1.08	0.004	242	4441	0.17	1	56.68	-	1.560	0.813	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	24.80	-	1.08	0.004	242	4441	0.17	1	56.91	-	2.040	1.063	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	24.80	-	2.16	0.009	242	4441	0.33	2	87.23	-	1.870	0.974	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	24.80	-	2.16	0.009	242	4441	0.33	2	87.80	-	1.710	0.891	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	24.80	-	2.16	0.009	242	4441	0.33	2	88.25	-	1.650	0.859	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	24.80	-	3.24	0.013	242	4441	0.50	3	118.63	-	1.730	0.901	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	24.80	-	3.24	0.013	242	4441	0.50	3	114.67	-	1.750	0.911	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	24.80	-	3.24	0.013	242	4441	0.50	3	114.55	-	2.000	1.042	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	24.80	-	4.33	0.018	242	4441	0.67	4	133.79	-	1.360	0.708	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	24.80	-	4.33	0.018	242	4441	0.67	4	135.03	-	1.440	0.750	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	24.80	-	4.33	0.018	242	4441	0.67	4	139.05	-	1.510	0.786	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	36.70	-	1.08	0.004	242	4441	0.17	1	61.89	-	1.520	0.792	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	36.70	-	1.08	0.004	242	4441	0.17	1	71.56	-	1.910	0.995	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	36.70	-	1.08	0.004	242	4441	0.17	1	65.51	-	1.600	0.833	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	36.70	-	2.16	0.009	242	4441	0.33	2	92.38	-	1.600	0.833	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	36.70	-	2.16	0.009	242	4441	0.33	2	97.64	-	1.680	0.875	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	36.70	-	2.16	0.009	242	4441	0.33	2	95.66	-	1.710	0.891	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	36.70	-	3.24	0.013	242	4441	0.50	3	121.23	-	1.520	0.792	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	36.70	-	3.24	0.013	242	4441	0.50	3	128.64	-	1.540	0.802	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	36.70	-	3.24	0.013	242	4441	0.50	3	116.53	-	1.700	0.885	-	LSG	ADM
Wu and Jiang [105]	CFRP_N	150	300	36.70	-	4.33	0.018	242	4441	0.67	4	141.77	-	1.620	0.844	-	LSG	ADM
Wu et al. [106]	CFRP_N	150	300	23.00	-	1.08	0.004	243	4234	0.17	1	45.00	-	-	-	-	LSG	ADF
Wu et al. [106]	CFRP_N	150	300	23.10	0.26	1.08	0.004	243	4234	0.17	1	44.90	2.01	-	-	-	LSG	ADF
Wu et al. [106]	CFRP_N	150	300	23.10	0.27	1.08	0.004	243	4234	0.17	1	45.90	2.15	-	-	-	LSG	ADF
Wu et al. [106]	CFRP_N	150	300	23.10	0.27	2.17	0.009	243	4234	0.33	2	82.00	3.75	-	-	-	LSG	ADF
Xiao and Wu [107]	CFRP_N	152	305	33.70	-	1.06	0.010	105	1577	0.38	1	47.90	1.20	0.840	0.559	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	33.70	-	1.06	0.010	105	1577	0.38	1	49.70	1.40	1.150	0.766	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	33.70	-	1.06	0.010	105	1577	0.38	1	49.40	1.24	0.870	0.579	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	33.70	-	2.12	0.020	105	1577	0.76	2	64.60	1.65	0.910	0.606	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	33.70	-	2.12	0.020	105	1577	0.76	2	75.20	2.25	1.000	0.666	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	33.70	-	2.12	0.020	105	1577	0.76	2	71.80	2.16	1.000	0.666	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	33.70	-	3.18	0.030	105	1577	1.14	3	82.90	2.45	0.820	0.546	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	33.70	-	3.18	0.030	105	1577	1.14	3	86.20	3.03	0.900	0.599	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	33.70	-	3.18	0.030	105	1577	1.14	3	95.40	3.03	0.900	0.599	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	43.80	-	1.06	0.010	105	1577	0.38	1	54.70	0.98	0.810	0.539	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	43.80	-	1.06	0.010	105	1577	0.38	1	52.10	0.47	0.760	0.506	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	43.80	-	1.06	0.010	105	1577	0.38	1	48.70	0.37	0.280	0.186	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	43.80	-	2.12	0.020	105	1577	0.76	2	84.00	1.57	0.920	0.613	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	43.80	-	2.12	0.020	105	1577	0.76	2	79.20	1.37	1.000	0.666	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	43.80	-	2.12	0.020	105	1577	0.76	2	85.00	1.66	1.010	0.672	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	43.80	-	3.18	0.030	105	1577	1.14	3	96.50	1.74	0.790	0.526	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	43.80	-	3.18	0.030	105	1577	1.14	3	92.60	1.68	0.710	0.473	-	LSG	ADM

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Xiao and Wu [107]	CFRP_N	152	305	43.80	-	3.18	0.030	105	1577	1.14	3	94.00	1.75	0.840	0.559	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	55.20	-	1.06	0.010	105	1577	0.38	1	57.90	0.69	0.700	0.466	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	55.20	-	1.06	0.010	105	1577	0.38	1	62.90	0.48	0.620	0.413	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	55.20	-	1.06	0.010	105	1577	0.38	1	58.10	0.49	0.190	0.127	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	55.20	-	2.12	0.020	105	1577	0.76	2	74.60	1.21	0.740	0.493	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	55.20	-	2.12	0.020	105	1577	0.76	2	77.60	0.81	0.830	0.553	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	55.20	-	2.12	0.020	105	1577	0.76	2	77.00	-	-	-	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	55.20	-	3.18	0.030	105	1577	1.14	3	106.50	1.43	0.760	0.506	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	55.20	-	3.18	0.030	105	1577	1.14	3	108.00	1.45	0.850	0.566	-	LSG	ADM
Xiao and Wu [107]	CFRP_N	152	305	55.20	-	3.18	0.030	105	1577	1.14	3	103.30	1.18	0.700	0.466	-	LSG	ADM
Yan et al. [108]	CFRP_N	305	610	15.00	0.20	1.14	0.013	87	1220	1.00	3	37.80	1.10	-	-	-	LSG	ADM
Youseff [109]	CFRP_N	406	812	38.30	-	2.43	0.023	105	1246	2.34	2	73.10	-	-	-	-	LSG	ASG
Youseff [109]	CFRP_N	406	812	45.60	-	2.43	0.023	105	1246	2.34	2	79.50	-	-	-	-	LSG	ASG
Youssef et al. [110]	CFRP_N	406	813	29.40	0.24	6.05	0.058	104	1246	5.84	9	125.80	2.81	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	406	813	29.40	0.24	6.05	0.058	104	1246	5.84	9	126.39	2.91	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	406	813	29.40	0.24	6.05	0.058	104	1246	5.84	9	127.01	2.80	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	406	813	29.40	0.24	3.61	0.035	104	1246	3.50	5	83.05	1.49	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	406	813	29.40	0.24	3.61	0.035	104	1246	3.50	5	88.68	1.62	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	406	813	29.40	0.24	2.40	0.023	104	1246	2.34	4	64.78	1.16	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	406	813	29.40	0.24	2.40	0.023	104	1246	2.34	4	62.09	1.11	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	406	813	29.40	0.24	2.40	0.023	104	1246	2.34	4	67.47	1.20	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	406	813	29.40	0.24	1.20	0.012	104	1246	1.17	2	45.95	0.65	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	406	813	29.40	0.24	1.20	0.012	104	1246	1.17	2	45.78	0.62	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	152	305	44.60	0.20	6.46	0.062	104	1246	2.34	4	124.08	2.85	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	152	305	44.60	0.20	6.46	0.062	104	1246	2.34	4	129.17	2.79	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	152	305	44.60	0.20	6.46	0.062	104	1246	2.34	4	138.72	2.84	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	152	305	44.60	0.20	4.83	0.047	104	1246	1.75	3	94.24	2.00	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	152	305	44.60	0.20	4.83	0.047	104	1246	1.75	3	95.02	2.00	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	152	305	44.60	0.20	4.83	0.047	104	1246	1.75	3	100.52	1.98	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	152	305	44.60	0.20	3.21	0.031	104	1246	1.17	2	85.96	1.71	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	152	305	44.60	0.20	3.21	0.031	104	1246	1.17	2	88.14	2.00	-	-	-	LSG	ADM
Youssef et al. [110]	CFRP_N	152	305	44.60	0.20	3.21	0.031	104	1246	1.17	2	84.23	2.00	-	-	-	LSG	ADM
Zhang et al. [111]	CFRP_N	150	300	34.30	-	2.44	0.027	91	753	1.00	1	59.40	2.10	-	-	-	N/A	ADF
Wang et al. [23]	CFRP_N	100	200	32.00	0.20	5.00	0.048	105	1674	1.18	1	143.40	3.74	1.540	0.850	-	LSG	ASG
Wang et al. [23]	CFRP_N	100	200	32.00	0.20	5.00	0.048	105	1674	1.18	1	131.90	3.51	1.520	0.920	-	LSG	ASG
Toutanji H. A. [112]	CFRP_N	76	305	30.93	0.20	2.68	0.012	231	3485	0.22	2	95.02	2.45	1.250	0.827	-	LSG	ASG
Al-Salloum Y.A. [113]	CFRP_N	150	300	32.40	-	2.42	0.032	75	935	1.20	1	83.16	-	-	-	-	LSG	ASG
Al-Salloum Y.A. [113]	CFRP_N	150	300	36.23	-	2.42	0.032	75	935	1.20	1	85.04	-	-	-	-	LSG	ASG
De Lorenzis et al. [47]	CFRP_N	55	110	43.00	0.41	1.00	0.011	91	1028	0.15	1	54.30	1.49	0.590	-	0.523	LSG	ASG
Ilki and Kumbasar [114]	CFRP_N	150	300	32.00	0.20	1.01	0.004	230	3430	0.17	1	47.20	1.44	0.790	-	0.530	LSG	ASG
Ilki and Kumbasar [114]	CFRP_N	150	300	32.00	0.20	3.05	0.013	230	3430	0.50	3	83.80	3.43	1.030	-	0.691	LSG	ASG
Ilki and Kumbasar [114]	CFRP_N	150	300	32.00	0.20	3.05	0.013	230	3430	0.50	3	91.00	3.92	1.080	-	0.724	LSG	ASG
Ilki and Kumbasar [114]	CFRP_N	150	300	32.00	0.20	5.09	0.022	230	3430	0.83	5	107.10	4.96	0.640	-	0.429	LSG	ASG
Ilki and Kumbasar [114]	CFRP_N	150	300	32.00	0.20	5.09	0.022	230	3430	0.83	5	107.70	4.32	1.000	-	0.671	LSG	ASG
Toutanji and Balaguru [115]	CFRP_N	76	305	31.80	0.20	2.65	0.012	228	3485	0.22	2	98.70	1.79	-	-	-	LSG	ASG

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Lin and Chen [116]	CFRP_N	120	240	32.70	-	2.64	0.017	158	770	0.50	1	51.00	-	-	-	-	N/A	N/A
Lin and Chen [116]	CFRP_N	120	240	32.70	-	2.64	0.017	158	770	0.50	1	49.60	-	-	-	-	N/A	N/A
Lin and Chen [116]	CFRP_N	120	240	32.70	-	5.30	0.034	158	770	1.00	2	77.30	-	-	-	-	N/A	N/A
Lin and Chen [116]	CFRP_N	120	240	32.70	-	5.30	0.034	158	770	1.00	2	68.90	-	-	-	-	N/A	N/A
Abdollahi et al. [117]	GFRP_N	150	300	14.80	0.24	0.36	0.014	26	537	0.51	1	30.00	1.85	-	-	-	N/A	ADF
Abdollahi et al. [117]	GFRP_N	150	300	25.10	0.23	0.36	0.014	26	537	0.51	1	34.20	1.40	-	-	-	N/A	ADF
Abdollahi et al. [117]	GFRP_N	150	300	41.70	0.28	0.36	0.014	26	537	0.51	1	51.90	0.43	-	-	-	N/A	ADF
Abdollahi et al. [117]	GFRP_N	150	300	25.10	0.23	0.72	0.027	26	537	1.02	2	55.50	1.96	-	-	-	N/A	ADF
Abdollahi et al. [117]	GFRP_N	150	300	25.10	0.23	1.44	0.055	26	537	2.03	4	83.30	2.77	-	-	-	N/A	ADF
Ahmad et al. [118]	GFRP_N	102	203	39.00	-	1.67	0.035	48	2070	0.88	2	115.30	-	-	-	-	N/A	N/A
Ahmad et al. [118]	GFRP_N	102	203	50.50	-	1.67	0.035	48	2070	0.88	2	135.10	-	-	-	-	N/A	N/A
Aire et al. [30]	GFRP_N	150	300	42.00	0.24	0.26	0.004	65	3000	0.15	1	41.00	0.73	0.550	-	0.119	LSG	ASG
Aire et al. [30]	GFRP_N	150	300	42.00	0.24	0.77	0.012	65	3000	0.45	3	61.00	1.74	1.300	-	0.282	LSG	ASG
Aire et al. [30]	GFRP_N	150	300	42.00	0.24	1.55	0.024	65	3000	0.89	6	85.00	2.50	1.100	-	0.238	LSG	ASG
Almusallam [119]	GFRP_N	150	300	47.70	0.31	0.94	0.035	27	540	1.30	1	56.70	1.49	0.849	0.425	-	LDL	ADM
Almusallam [119]	GFRP_N	150	300	47.70	0.31	2.81	0.107	27	540	3.90	3	100.10	2.72	0.800	0.400	-	LDL	ADM
Almusallam [119]	GFRP_N	150	300	50.80	0.29	0.94	0.035	27	540	1.30	1	55.50	0.97	1.007	0.504	-	LDL	ADM
Almusallam [119]	GFRP_N	150	300	50.80	0.29	2.81	0.107	27	540	3.90	3	90.80	0.97	0.802	0.401	-	LDL	ADM
Au and Buyukozturk [120]	GFRP_N	150	375	24.20	0.36	0.84	0.032	26	575	1.20	1	43.80	2.23	1.480	0.672	-	LDL	ADM
Berthet et al. [39]	GFRP_N	160	320	25.00	-	0.61	0.008	74	2500	0.33	3	42.80	1.70	1.655	-	0.490	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	25.00	-	0.61	0.008	74	2500	0.33	3	42.30	1.69	1.643	-	0.486	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	25.00	-	0.61	0.008	74	2500	0.33	3	43.10	1.71	1.671	-	0.495	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	40.00	-	0.41	0.006	74	2500	0.22	2	44.80	0.53	1.369	-	0.405	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	40.00	-	0.41	0.006	74	2500	0.22	2	46.30	0.47	1.246	-	0.369	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	40.00	-	0.41	0.006	74	2500	0.22	2	49.80	0.50	1.075	-	0.318	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	40.00	-	0.61	0.008	74	2500	0.33	3	50.80	0.63	0.900	-	0.266	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	40.00	-	0.61	0.008	74	2500	0.33	3	50.80	0.58	1.281	-	0.379	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	40.00	-	0.61	0.008	74	2500	0.33	3	51.80	0.64	1.197	-	0.354	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	40.00	-	1.02	0.014	74	2500	0.55	5	66.70	1.05	1.546	-	0.458	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	40.00	-	1.02	0.014	74	2500	0.55	5	68.20	1.24	1.817	-	0.538	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	40.00	-	1.02	0.014	74	2500	0.55	5	67.70	1.17	1.582	-	0.468	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	52.00	-	0.92	0.012	74	2500	0.50	3	64.70	0.53	1.190	-	0.352	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	52.00	-	0.92	0.012	74	2500	0.50	3	75.10	1.13	1.265	-	0.374	LSG	ASG
Berthet et al. [39]	GFRP_N	160	320	52.00	-	0.92	0.012	74	2500	0.50	3	76.10	1.17	1.274	-	0.377	LSG	ASG
Bouchelaghem et al. [42]	GFRP_N	160	320	26.00	-	0.11	0.013	9	171	0.50	2	42.60	-	-	-	-	LSG	ASG
Bouchelaghem et al. [42]	GFRP_N	160	320	26.00	-	0.02	0.008	3	135	0.30	1	37.32	-	-	-	-	LSG	ASG
Bullo [121]	GFRP_N	150	300	32.54	0.25	0.80	0.012	65	1700	0.46	3	72.43	3.73	2.145	-	0.820	N/A	N/A
Bullo [121]	GFRP_N	150	300	32.54	0.25	0.80	0.012	65	1700	0.46	3	73.56	3.93	2.171	-	0.830	N/A	N/A
Bullo [121]	GFRP_N	150	300	32.54	0.25	0.80	0.012	65	1700	0.46	3	75.83	2.85	2.048	-	0.783	N/A	N/A
Bullo [121]	GFRP_N	150	300	32.54	0.25	1.99	0.031	65	1700	1.15	7	118.84	4.28	1.961	-	0.750	N/A	N/A
Bullo [121]	GFRP_N	150	300	32.54	0.25	1.99	0.031	65	1700	1.15	7	130.15	4.04	1.918	-	0.733	N/A	N/A
Bullo [121]	GFRP_N	150	300	32.54	0.25	1.99	0.031	65	1700	1.15	7	135.81	4.84	1.816	-	0.694	N/A	N/A
Comert et al. [122]	GFRP_N	150	300	39.00	-	0.97	0.015	65	1700	0.56	2	64.00	2.30	-	-	-	LSG	ASG
Comert et al. [122]	GFRP_N	150	300	39.00	-	0.97	0.015	65	1700	0.56	2	61.00	2.10	-	-	-	LSG	ASG
Cui and Sheikh [46]	GFRP_N	152	305	47.80	0.22	0.72	0.033	22	508	1.25	1	59.10	1.35	2.020	0.874	-	LSG	ADM
Cui and Sheikh [46]	GFRP_N	152	305	47.80	0.22	0.72	0.033	22	508	1.25	1	59.80	1.15	2.143	0.928	-	LSG	ADM

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Cui and Sheikh [46]	GFRP_N	152	305	47.80	0.22	1.45	0.067	22	508	2.50	3	88.90	2.21	2.032	0.880	-	LSG	ADM
Cui and Sheikh [46]	GFRP_N	152	305	47.80	0.22	1.45	0.067	22	508	2.50	3	88.00	2.21	2.114	0.915	-	LSG	ADM
Cui and Sheikh [46]	GFRP_N	152	305	47.80	0.22	2.17	0.101	22	508	3.75	4	113.20	2.85	2.112	0.914	-	LSG	ADM
Cui and Sheikh [46]	GFRP_N	152	305	47.80	0.22	2.17	0.101	22	508	3.75	4	112.50	2.80	2.110	0.913	-	LSG	ADM
Demers and Neale [48]	GFRP_N	152	305	32.20	-	0.28	0.026	11	220	1.00	1	31.00	-	-	-	-	N/A	N/A
Demers and Neale [48]	GFRP_N	152	305	32.20	-	0.28	0.026	11	220	1.00	1	30.80	-	-	-	-	N/A	N/A
Demers and Neale [48]	GFRP_N	152	305	32.20	-	0.83	0.081	11	220	3.00	3	48.30	2.04	-	-	-	N/A	N/A
Demers and Neale [48]	GFRP_N	152	305	32.20	-	0.83	0.081	11	220	3.00	3	48.30	1.97	-	-	-	N/A	N/A
Green et al. [52]	GFRP_N	152	305	54.00	-	0.46	0.053	9	182	2.00	2	62.00	-	-	-	-	LSG	ASG
Harries and Carey [123]	GFRP_N	152	305	31.80	0.28	0.39	0.081	5	75	3.00	3	37.30	0.65	1.216	0.794	0.813	LSG	ADM
Harries and Carey [123]	GFRP_N	152	305	31.80	0.28	1.16	0.251	5	75	9.00	9	53.20	0.95	1.438	0.939	0.962	LSG	ADM
Harries and Kharel [54]	GFRP_N	152	305	32.10	0.28	0.13	0.026	5	75	1.00	1	36.80	0.44	-	-	-	N/A	N/A
Harries and Kharel [54]	GFRP_N	152	305	32.10	0.28	0.26	0.053	5	75	2.00	2	36.60	0.40	-	-	-	N/A	N/A
Harries and Kharel [54]	GFRP_N	152	305	32.10	0.28	0.39	0.081	5	75	3.00	3	36.60	0.50	1.200	0.784	0.803	N/A	N/A
Harries and Kharel [54]	GFRP_N	152	305	32.10	0.28	0.77	0.164	5	75	6.00	6	37.60	0.57	1.030	0.673	0.689	N/A	N/A
Harries and Kharel [54]	GFRP_N	152	305	32.10	0.28	1.16	0.251	5	75	9.00	9	46.70	0.68	1.110	0.725	0.742	N/A	N/A
Harries and Kharel [54]	GFRP_N	152	305	32.10	0.28	1.55	0.341	5	75	12.00	12	50.20	0.82	1.090	0.712	0.729	N/A	N/A
Harries and Kharel [54]	GFRP_N	152	305	32.10	0.28	1.93	0.434	5	75	15.00	15	60.00	0.87	1.110	0.725	0.742	N/A	N/A
Choudhury et al. [58]	GFRP_N	100	200	29.16	-	1.14	0.015	76	2300	0.38	1	67.37	0.35	-	-	-	LDICT	ADF
Choudhury et al. [58]	GFRP_N	100	200	28.86	-	1.14	0.015	76	2300	0.38	1	54.21	0.22	-	-	-	LDICT	ADF
Choudhury et al. [58]	GFRP_N	150	300	29.39	-	0.76	0.010	76	2300	0.38	1	56.32	0.22	-	-	-	LDICT	ADF
Choudhury et al. [58]	GFRP_N	150	300	35.21	-	0.76	0.010	76	2300	0.38	1	56.28	0.20	-	-	-	LDICT	ADF
Choudhury et al. [58]	GFRP_N	200	400	32.59	-	0.57	0.008	76	2300	0.38	1	47.89	0.16	-	-	-	LDICT	ADF
Jiang and Teng [61]	GFRP_N	152	305	33.10	0.31	0.36	0.004	80	1826	0.17	1	42.40	1.30	2.080	0.912	-	LSG	ASG
Jiang and Teng [61]	GFRP_N	152	305	33.10	0.31	0.36	0.004	80	1826	0.17	1	41.60	1.27	1.758	0.771	-	LSG	ASG
Jiang and Teng [61]	GFRP_N	152	305	45.90	0.24	0.36	0.004	80	1826	0.17	1	40.50	0.81	1.523	0.668	-	LSG	ASG
Jiang and Teng [61]	GFRP_N	152	305	45.90	0.24	0.36	0.004	80	1826	0.17	1	40.50	1.06	1.915	0.840	-	LSG	ASG
Jiang and Teng [61]	GFRP_N	152	305	45.90	0.24	0.72	0.009	81	1826	0.34	2	52.80	1.20	1.639	0.719	-	LSG	ASG
Jiang and Teng [61]	GFRP_N	152	305	45.90	0.24	0.72	0.009	81	1826	0.34	2	55.20	1.25	1.799	0.789	-	LSG	ASG
Jiang and Teng [61]	GFRP_N	152	305	45.90	0.24	1.08	0.013	81	1826	0.51	3	64.60	1.55	1.594	0.699	-	LSG	ASG
Jiang and Teng [61]	GFRP_N	152	305	45.90	0.24	1.08	0.013	81	1826	0.51	3	65.90	1.90	1.940	0.851	-	LSG	ASG
Jiang and Teng [61]	GFRP_N	152	305	45.90	-	0.36	0.004	80	1826	0.17	1	48.40	-	-	-	-	LSG	ASG
Harries and Kharel [124]	GFRP_N	153	305	32.10	0.28	0.02	0.004	5	75	0.17	1	36.80	0.44	-	-	-	LSG	ADM
Harries and Kharel [124]	GFRP_N	153	305	32.10	0.28	0.04	0.009	5	75	0.34	2	36.60	0.40	-	-	-	LSG	ADM
Harries and Kharel [124]	GFRP_N	153	305	32.10	0.28	0.07	0.013	5	75	0.51	3	36.60	0.50	1.200	0.784	-	LSG	ADM
Harries and Kharel [124]	GFRP_N	153	305	32.10	0.28	0.13	0.027	5	75	1.02	6	37.60	0.57	1.030	0.673	-	LSG	ADM
Harries and Kharel [124]	GFRP_N	153	305	32.10	0.28	0.20	0.040	5	75	1.53	9	46.70	0.68	1.110	0.725	-	LSG	ADM
Harries and Kharel [124]	GFRP_N	153	305	32.10	0.28	0.26	0.054	5	75	2.04	12	50.20	0.82	1.090	0.712	-	LSG	ADM
Harries and Kharel [124]	GFRP_N	153	305	32.10	0.28	0.33	0.068	5	75	2.55	15	60.00	0.87	1.110	0.725	-	LSG	ADM
Kshirsagar et al. [125]	GFRP_N	102	204	38.00	-	1.11	0.056	20	363	1.42	1	57.00	1.73	1.740	0.363	-	LSG	ASG
Kshirsagar et al. [125]	GFRP_N	102	204	39.40	-	1.11	0.056	20	363	1.42	1	63.10	1.60	2.070	0.431	-	LSG	ASG
Kshirsagar et al. [125]	GFRP_N	102	204	39.50	-	1.11	0.056	20	363	1.42	1	60.40	1.79	1.890	0.394	-	LSG	ASG
Lam and Teng [67]	GFRP_N	152	305	38.50	0.22	0.73	0.034	22	507	1.27	1	56.20	-	1.849	0.797	-	LSG	ASG
Lam and Teng [67]	GFRP_N	152	305	38.50	0.22	0.73	0.034	22	506	1.27	1	51.90	1.32	1.442	0.622	-	LSG	ASG
Lam and Teng [67]	GFRP_N	152	305	38.50	0.22	0.71	0.034	21	506	1.27	1	58.30	1.46	1.885	0.813	-	LSG	ASG
Lam and Teng [67]	GFRP_N	152	305	38.50	0.22	1.41	0.068	21	506	2.54	2	75.70	2.46	1.762	0.759	-	LSG	ASG

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Lam and Teng [67]	GFRP_N	152	305	38.50	0.22	1.41	0.068	21	506	2.54	2	77.30	2.19	1.674	0.722	-	LSG	ASG
Lam and Teng [67]	GFRP_N	152	305	38.50	0.22	1.41	0.068	21	506	2.54	2	75.20	-	1.772	0.764	-	LSG	ASG
Li et al. [126]	GFRP_N	152	305	45.60	-	0.29	0.019	15	320	0.74	2	49.40	-	-	-	-	N/A	N/A
Lim and Ozakkaloglu [127]	GFRP_N	153	305	33.90	0.22	1.00	0.011	95	3055	0.40	2	78.10	3.39	2.450	-	0.764	LSG	ADM
Lim and Ozakkaloglu [127]	GFRP_N	153	305	33.90	0.22	1.00	0.011	95	3055	0.40	2	76.30	3.63	2.480	-	0.774	LSG	ADM
Lim and Ozakkaloglu [127]	GFRP_N	153	305	33.90	0.22	1.00	0.011	95	3055	0.40	2	75.10	3.23	2.490	-	0.777	LSG	ADM
Lim and Ozakkaloglu [127]	GFRP_N	153	305	52.14	0.25	3.00	0.032	95	3055	1.20	4	119.40	2.81	2.560	-	0.799	LSG	ADM
Lim and Ozakkaloglu [127]	GFRP_N	153	305	52.18	0.25	3.00	0.032	95	3055	1.20	4	126.80	3.48	2.600	-	0.811	LSG	ADM
Lim and Ozakkaloglu [127]	GFRP_N	153	305	52.21	0.25	3.00	0.032	95	3055	1.20	4	125.30	3.36	2.580	-	0.805	LSG	ADM
Lim and Ozakkaloglu [127]	GFRP_N	153	305	54.33	0.25	3.00	0.032	95	3055	1.20	4	109.20	3.44	2.300	-	0.717	LSG	ADM
Lim and Ozakkaloglu [127]	GFRP_N	153	305	54.41	0.25	3.00	0.032	95	3055	1.20	4	123.50	4.28	2.390	-	0.746	LSG	ADM
Lim and Ozakkaloglu [127]	GFRP_N	153	305	54.29	0.25	3.00	0.032	95	3055	1.20	4	126.50	4.54	2.570	-	0.802	LSG	ADM
Lin and Chen [116]	GFRP_N	120	240	32.70	-	0.99	0.030	33	744	0.90	2	62.20	-	-	-	-	N/A	N/A
Lin and Chen [116]	GFRP_N	120	240	32.70	-	0.99	0.030	33	744	0.90	2	61.40	-	-	-	-	N/A	N/A
Lin and Chen [116]	GFRP_N	120	240	32.70	-	0.99	0.030	33	744	0.90	2	66.30	-	-	-	-	N/A	N/A
Lin and Chen [116]	GFRP_N	120	240	32.70	-	1.97	0.061	33	744	1.80	4	101.30	-	-	-	-	N/A	N/A
Lin and Chen [116]	GFRP_N	120	240	32.70	-	1.97	0.061	33	744	1.80	4	88.00	-	-	-	-	N/A	N/A
Lin and Chen [116]	GFRP_N	120	240	32.70	-	1.97	0.061	33	744	1.80	4	104.50	-	-	-	-	N/A	N/A
Mandal et al. [31]	GFRP_N	103	200	30.70	0.27	1.32	0.051	26	575	1.30	1	54.50	1.54	-	-	-	LSG	ASG
Mandal et al. [31]	GFRP_N	105	200	30.70	0.27	2.59	0.102	26	575	2.60	2	79.30	2.75	-	-	-	LSG	ASG
Mandal et al. [31]	GFRP_N	103	200	46.30	0.23	1.32	0.051	26	575	1.30	1	58.50	0.90	-	-	-	LSG	ASG
Mandal et al. [31]	GFRP_N	105	200	46.30	0.23	2.59	0.102	26	575	2.60	2	83.80	1.48	-	-	-	LSG	ASG
Mandal et al. [31]	GFRP_N	103	200	54.50	0.24	1.32	0.051	26	575	1.30	1	63.50	0.32	-	-	-	LSG	ASG
Mandal et al. [31]	GFRP_N	105	200	54.50	0.24	2.59	0.102	26	575	2.60	2	84.10	0.80	-	-	-	LSG	ASG
Mastrapa [128]	GFRP_N	153	305	29.80	-	0.31	0.016	19	565	0.61	1	33.70	-	-	-	-	N/A	N/A
Mastrapa [128]	GFRP_N	153	305	31.20	-	0.93	0.049	19	565	1.84	3	67.50	3.01	2.260	0.767	0.701	N/A	N/A
Mastrapa [128]	GFRP_N	153	305	31.20	-	0.93	0.049	19	565	1.84	3	64.67	3.13	1.990	0.676	0.617	N/A	N/A
Mastrapa [128]	GFRP_N	153	305	31.20	-	1.55	0.082	19	565	3.07	5	91.01	5.27	1.830	0.621	0.568	N/A	N/A
Mastrapa [128]	GFRP_N	153	305	31.20	-	1.55	0.082	19	565	3.07	5	96.87	6.25	1.800	0.611	0.559	N/A	N/A
Mastrapa [128]	GFRP_N	153	305	37.20	-	2.04	0.109	19	586	4.06	7	111.00	-	-	-	-	N/A	N/A
Micelli et al. [27]	GFRP_N	102	204	32.00	0.14	0.99	0.014	72	1520	0.35	1	51.60	1.25	1.250	-	0.592	LSG	ASG
Mirmiran et al. [129]	GFRP_N	153	305	29.80	-	0.40	0.007	56	1800	0.28	1	31.03	1.00	-	-	-	LSG	ADF
Mirmiran et al. [129]	GFRP_N	153	305	29.80	-	0.40	0.007	56	1800	0.28	1	34.06	1.30	-	-	-	LSG	ADF
Mirmiran et al. [129]	GFRP_N	153	305	29.80	-	0.40	0.007	56	1800	0.28	1	35.58	1.50	-	-	-	LSG	ADF
Mirmiran et al. [129]	GFRP_N	153	305	29.80	-	1.21	0.022	56	1800	0.83	3	63.02	2.70	-	-	-	LSG	ADF
Mirmiran et al. [129]	GFRP_N	153	305	29.80	-	1.21	0.022	56	1800	0.83	3	49.02	1.80	-	-	-	LSG	ADF
Mirmiran et al. [129]	GFRP_N	153	305	29.80	-	1.21	0.022	56	1800	0.83	3	58.68	3.30	-	-	-	LSG	ADF
Mirmiran et al. [129]	GFRP_N	153	305	29.80	-	2.02	0.036	56	1800	1.38	4	86.81	3.30	-	-	-	LSG	ADF
Mirmiran et al. [129]	GFRP_N	153	305	29.80	-	2.02	0.036	56	1800	1.38	4	88.32	3.60	-	-	-	LSG	ADF
Mirmiran et al. [129]	GFRP_N	153	305	29.80	-	2.02	0.036	56	1800	1.38	4	93.63	3.80	-	-	-	LSG	ADF
Mirmiran et al. [129]	GFRP_N	153	305	31.20	-	1.21	0.022	56	1800	0.83	3	63.09	3.10	-	-	-	LSG	ADF

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Mirmiran et al. [129]	GFRP_N	153	305	31.20	-	1.21	0.022	56	1800	0.83	3	65.43	3.10	-	-	-	LSG	ADF
Mirmiran et al. [129]	GFRP_N	153	305	31.20	-	2.02	0.036	56	1800	1.38	4	91.91	4.30	-	-	-	LSG	ADF
Mirmiran et al. [129]	GFRP_N	153	305	31.20	-	2.02	0.036	56	1800	1.38	4	89.01	5.00	-	-	-	LSG	ADF
Modarelli et al. [78]	GFRP_N	150	300	28.35	0.49	0.53	0.006	86	1957	0.23	1	53.27	1.90	1.498	-	0.658	LSG	ADF
Moretti and Arvanitopoulos [79]	GFRP_N	152	305	18.30	-	0.34	0.005	76	3910	0.17	1	26.43	1.14	1.621	-	0.315	LSG	ASG
Moretti and Arvanitopoulos [79]	GFRP_N	152	305	18.30	-	0.34	0.005	76	3910	0.17	1	27.48	1.03	1.430	-	0.278	LSG	ASG
Moretti and Arvanitopoulos [79]	GFRP_N	152	305	18.30	-	0.34	0.005	76	3910	0.17	1	25.76	1.23	1.325	-	0.258	LSG	ASG
Moretti and Arvanitopoulos [79]	GFRP_N	152	305	18.30	-	0.34	0.005	76	3910	0.17	1	26.86	1.30	1.439	-	0.280	LSG	ASG
Moretti and Arvanitopoulos [79]	GFRP_N	152	305	18.85	-	0.34	0.005	76	3910	0.17	1	27.87	1.71	1.547	-	0.301	LSG	ASG
Moretti and Arvanitopoulos [79]	GFRP_N	152	305	18.85	-	0.34	0.005	76	3910	0.17	1	26.65	1.35	1.555	-	0.302	LSG	ASG
Moretti and Arvanitopoulos [79]	GFRP_N	152	305	19.30	-	0.34	0.005	76	3910	0.17	1	25.89	1.11	1.119	-	0.218	LSG	ASG
Moretti and Arvanitopoulos [79]	GFRP_N	152	305	19.30	-	0.34	0.005	76	3910	0.17	1	26.53	1.26	1.817	-	0.353	LSG	ASG
Moretti and Arvanitopoulos [79]	GFRP_N	152	305	19.30	-	0.69	0.009	76	3910	0.34	2	39.14	3.02	1.300	-	0.253	LSG	ASG
Moretti and Arvanitopoulos [79]	GFRP_N	152	305	19.30	-	0.69	0.009	76	3910	0.34	2	35.00	1.44	1.148	-	0.223	LSG	ASG
Moretti and Arvanitopoulos [79]	GFRP_N	100	200	19.30	-	0.52	0.007	76	3910	0.17	1	33.66	0.83	1.154	-	0.224	LSG	ASG
Moretti and Arvanitopoulos [79]	GFRP_N	100	200	19.70	-	1.05	0.014	76	3910	0.34	2	44.34	1.76	1.157	-	0.225	LSG	ASG
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	0.42	0.008	52	583	0.30	1	46.00	2.29	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	0.42	0.008	52	583	0.30	1	41.20	1.89	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	0.83	0.016	52	583	0.60	2	60.52	3.08	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	0.83	0.016	52	583	0.60	2	59.23	3.41	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	0.83	0.016	52	583	0.60	2	59.77	2.74	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	0.83	0.016	52	583	0.60	2	60.16	2.89	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	0.83	0.016	52	583	0.60	2	69.02	3.10	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	0.83	0.016	52	583	0.60	2	55.75	2.49	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	0.83	0.016	52	583	0.60	2	56.41	2.97	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	1.66	0.032	52	583	1.20	4	84.88	3.15	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	1.66	0.032	52	583	1.20	4	84.33	4.15	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	1.66	0.032	52	583	1.20	4	79.64	4.10	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	1.66	0.032	52	583	1.20	4	106.87	5.24	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	1.66	0.032	52	583	1.20	4	104.94	5.45	-	-	-	N/A	ADF
Nanni and Bradford [130]	GFRP_N	150	300	36.30	-	1.66	0.032	52	583	1.20	4	107.91	4.51	-	-	-	N/A	ADF
Pessiki et al. [81]	GFRP_N	152	610	26.20	-	0.58	0.026	22	383	1.00	1	38.40	1.30	1.150	0.661	-	LSG	ADF
Pessiki et al. [81]	GFRP_N	152	610	26.20	-	1.16	0.053	22	383	2.00	2	52.50	1.82	1.240	0.712	-	LSG	ADF
Shao et al. [131]	GFRP_N	152	305	40.20	-	0.70	0.027	26	610	1.02	1	49.60	-	-	-	-	LSG	ASG
Shao et al. [131]	GFRP_N	152	305	40.20	-	1.40	0.054	26	610	2.03	2	71.40	-	-	-	-	LSG	ASG
Silva and Rodrigues [132]	GFRP_N	150	300	31.10	0.24	1.44	0.069	21	464	2.54	2	91.60	2.61	1.985	0.911	0.901	LSG	ASG
Silva and Rodrigues [132]	GFRP_N	150	300	29.60	0.24	1.44	0.069	21	464	2.54	2	89.40	2.72	-	-	-	LSG	ASG
Silva and Rodrigues [132]	GFRP_N	150	300	31.10	0.24	1.44	0.069	21	464	2.54	2	87.50	2.28	1.890	0.867	0.858	LSG	ASG
Silva and Rodrigues [132]	GFRP_N	150	450	31.10	0.24	1.44	0.069	21	464	2.54	2	91.90	2.34	1.865	0.856	0.847	LSG	ASG
Silva and Rodrigues [132]	GFRP_N	150	450	29.60	0.24	1.44	0.069	21	464	2.54	2	89.80	2.32	-	-	-	LSG	ASG
Silva and Rodrigues [132]	GFRP_N	150	450	31.20	0.24	1.44	0.069	21	464	2.54	2	91.90	2.31	1.925	0.883	0.874	LSG	ASG
Silva and Rodrigues [132]	GFRP_N	250	750	31.20	0.24	0.87	0.041	21	464	2.54	2	55.80	1.09	1.160	0.532	0.527	LSG	ASG
Silva and Rodrigues [132]	GFRP_N	150	600	31.20	0.24	1.44	0.069	21	464	2.54	2	81.20	2.05	1.462	0.671	-	LSG	ASG
Silva and Rodrigues [132]	GFRP_N	150	600	31.20	0.24	1.44	0.069	21	464	2.54	2	88.70	2.55	-	-	-	LSG	ASG
Silva and Rodrigues [132]	GFRP_N	150	600	31.20	0.24	1.44	0.069	21	464	2.54	2	87.50	2.21	1.420	0.651	-	LSG	ASG

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Silva and Rodrigues [132]	GFRP_N	150	750	31.10	0.24	1.44	0.069	21	464	2.54	2	89.10	2.43	1.665	0.764	-	LSG	ASG
Silva and Rodrigues [132]	GFRP_N	150	750	29.60	0.24	1.44	0.069	21	464	2.54	2	86.00	2.65	-	-	-	LSG	ASG
Silva and Rodrigues [132]	GFRP_N	150	750	37.60	0.24	2.16	0.104	21	464	3.81	3	128.10	2.44	1.535	0.704	-	LSG	ASG
Suter and Pinzelli [94]	GFRP_N	150	300	44.70	-	0.60	0.008	73	2300	0.31	1	52.69	0.23	-	-	-	N/A	N/A
Teng et al. [133]	GFRP_N	153	305	39.60	0.26	0.36	0.004	80	1826	0.17	1	37.20	0.94	1.609	0.706	-	LSG	ASG
Teng et al. [133]	GFRP_N	153	305	39.60	0.26	0.36	0.004	80	1826	0.17	1	38.80	0.83	1.869	0.820	-	LSG	ASG
Teng et al. [133]	GFRP_N	153	305	39.60	0.26	0.72	0.009	80	1826	0.34	2	54.60	2.13	2.040	0.895	-	LSG	ASG
Teng et al. [133]	GFRP_N	153	305	39.60	0.26	0.72	0.009	80	1826	0.34	2	56.30	1.83	2.061	0.904	-	LSG	ASG
Teng et al. [133]	GFRP_N	153	305	39.60	0.26	1.08	0.013	81	1826	0.51	3	65.70	2.56	1.955	0.858	-	LSG	ASG
Teng et al. [133]	GFRP_N	153	305	39.60	0.26	1.08	0.013	81	1826	0.51	3	60.90	1.79	1.667	0.731	-	LSG	ASG
Thériault et al. [96]	GFRP_N	152	304	37.00	-	2.83	0.105	28	642	3.90	3	90.00	-	-	-	-	LSG	ASG
Thériault et al. [96]	GFRP_N	51	102	18.00	-	2.81	0.105	28	642	1.30	1	64.00	-	-	-	-	LSG	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	26.20	0.27	0.65	0.025	26	325	1.00	1	38.30	1.50	1.480	0.779	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	26.20	0.27	0.65	0.025	26	325	1.00	1	34.60	1.26	1.450	0.763	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	26.20	0.27	0.65	0.025	26	325	1.00	1	38.00	1.39	1.500	0.789	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	26.20	0.27	1.30	0.051	26	325	2.00	2	30.20	0.68	0.287	0.151	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	26.20	0.27	1.30	0.051	26	325	2.00	2	49.40	2.41	1.450	0.763	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	26.20	0.27	1.30	0.051	26	325	2.00	2	52.50	2.55	1.500	0.789	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	26.20	0.27	1.95	0.076	26	325	3.00	3	62.80	3.39	1.400	0.737	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	26.20	0.27	1.95	0.076	26	325	3.00	3	56.40	2.98	1.300	0.684	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	26.20	0.27	1.95	0.076	26	325	3.00	3	54.70	2.89	1.290	0.679	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	42.60	0.29	0.65	0.025	26	325	1.00	1	56.50	1.10	1.430	0.753	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	42.60	0.29	0.65	0.025	26	325	1.00	1	55.50	1.04	1.400	0.737	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	42.60	0.29	0.65	0.025	26	325	1.00	1	59.80	1.23	1.630	0.858	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	42.60	0.29	1.30	0.051	26	325	2.00	2	68.50	1.65	1.460	0.768	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	42.60	0.29	1.30	0.051	26	325	2.00	2	70.00	1.72	1.470	0.774	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	42.60	0.29	1.30	0.051	26	325	2.00	2	71.70	1.81	1.500	0.789	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	42.60	0.29	1.95	0.076	26	325	3.00	3	75.50	2.10	1.400	0.737	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	42.60	0.29	1.95	0.076	26	325	3.00	3	78.80	2.49	1.500	0.789	-	LDL	ASG
Touhari, Mitiche-Kettab [97]	GFRP_N	160	320	42.60	0.29	1.95	0.076	26	325	3.00	3	77.50	2.24	1.430	0.753	-	LDL	ASG
Toutanji and Deng [98]	GFRP_N	76	305	30.90	-	0.92	0.013	73	1578	0.24	1	60.80	-	-	-	-	LSG	ASG
Wong et al. [134]	GFRP_N	153	305	46.70	0.29	0.71	0.009	80	1826	0.34	2	58.00	1.77	-	-	-	LSG	ADM
Wong et al. [134]	GFRP_N	153	305	36.70	0.27	0.72	0.009	80	1826	0.34	2	53.10	1.53	-	-	-	LSG	ADM
Wong et al. [134]	GFRP_N	153	305	36.50	0.26	0.72	0.009	80	1826	0.34	2	53.80	1.54	-	-	-	LSG	ADM
Wong et al. [134]	GFRP_N	153	305	36.50	0.26	1.08	0.013	80	1826	0.51	3	63.10	2.15	-	-	-	LSG	ADM
Wu et al. [106]	GFRP_N	150	300	23.00	-	0.76	0.009	81	1794	0.35	1	45.00	-	-	-	-	LSG	ADF
Wu et al. [106]	GFRP_N	150	300	23.10	0.27	0.76	0.009	81	1794	0.35	1	46.40	2.49	-	-	-	LSG	ADF
Wu et al. [106]	GFRP_N	150	300	23.10	0.27	0.76	0.009	81	1794	0.35	1	45.00	2.36	-	-	-	LSG	ADF
Youseff [109]	GFRP_N	153	306	44.10	-	0.79	0.044	18	425	1.68	2	65.50	-	-	-	-	LSG	ASG
Youssef et al. [110]	GFRP_N	406	813	29.40	0.24	1.32	0.073	18	425	7.27	7	70.77	1.53	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	406	813	29.40	0.24	1.32	0.073	18	425	7.27	7	71.78	1.45	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	406	813	29.40	0.24	1.32	0.073	18	425	7.27	7	76.78	1.39	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	406	813	29.40	0.24	0.81	0.045	18	425	4.47	4	49.53	1.35	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	406	813	29.40	0.24	0.81	0.045	18	425	4.47	4	54.90	1.00	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	406	813	29.40	0.24	0.81	0.045	18	425	4.47	4	61.19	1.19	-	-	-	LSG	ADM

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Youssef et al. [110]	GFRP_N	406	813	29.40	0.24	0.61	0.033	18	425	3.35	3	49.30	0.97	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	406	813	29.40	0.24	0.61	0.033	18	425	3.35	3	51.19	0.90	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	406	813	29.40	0.24	0.61	0.033	18	425	3.35	3	47.88	0.91	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	406	813	29.40	0.24	0.30	0.017	18	425	1.68	2	44.14	0.78	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	406	813	29.40	0.24	0.30	0.017	18	425	1.68	2	42.96	0.70	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	406	813	29.40	0.24	0.30	0.017	18	425	1.68	2	45.11	0.72	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	152	305	44.10	0.24	1.63	0.090	18	425	3.35	3	94.10	2.01	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	152	305	44.10	0.24	1.63	0.090	18	425	3.35	3	91.87	2.01	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	152	305	44.10	0.24	1.63	0.090	18	425	3.35	3	89.29	2.01	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	152	305	44.10	0.24	1.08	0.060	18	425	2.24	2	80.39	1.52	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	152	305	44.10	0.24	1.08	0.060	18	425	2.24	2	80.04	1.49	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	152	305	44.10	0.24	1.08	0.060	18	425	2.24	2	81.13	1.53	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	152	305	44.10	0.24	0.81	0.045	18	425	1.68	2	66.20	1.30	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	152	305	44.10	0.24	0.81	0.045	18	425	1.68	2	66.60	1.36	-	-	-	LSG	ADM
Youssef et al. [110]	GFRP_N	152	305	44.10	0.24	0.81	0.045	18	425	1.68	2	63.62	1.30	-	-	-	LSG	ADM
Toutanji H. A. [112]	GFRP_N	76	305	30.93	0.20	0.90	0.012	73	1518	0.24	2	60.82	1.53	1.630	-	0.778	LSG	ASG
Toutanji and Balaguru [115]	GFRP_N	76	305	31.80	0.20	0.86	0.012	69	1518	0.24	2	63.20	1.43	-	-	-	LSG	ASG
Dai et al. [135]	AFRP_N	152	305	39.20	-	0.51	0.004	115	3732	0.17	1	61.40	2.33	3.160	0.975	1.053	LSG	ASG
Dai et al. [135]	AFRP_N	152	305	39.20	-	0.51	0.004	115	3732	0.17	1	62.70	2.33	3.130	0.966	1.043	LSG	ASG
Dai et al. [135]	AFRP_N	152	305	39.20	-	0.51	0.004	115	3732	0.17	1	55.80	2.07	3.210	0.991	1.070	LSG	ASG
Dai et al. [135]	AFRP_N	152	305	39.20	-	1.03	0.009	116	3732	0.34	2	90.10	3.80	2.890	0.892	0.963	LSG	ASG
Dai et al. [135]	AFRP_N	152	305	39.20	-	1.03	0.009	116	3732	0.34	2	88.30	3.45	3.050	0.941	1.017	LSG	ASG
Dai et al. [135]	AFRP_N	152	305	39.20	-	1.03	0.009	116	3732	0.34	2	83.30	3.68	2.960	0.914	0.987	LSG	ASG
Dai et al. [135]	AFRP_N	152	305	39.20	-	1.55	0.013	116	3732	0.51	3	113.20	4.39	2.740	0.846	0.913	LSG	ASG
Dai et al. [135]	AFRP_N	152	305	39.20	-	1.55	0.013	116	3732	0.51	3	116.30	4.60	2.460	0.759	0.820	LSG	ASG
Dai et al. [135]	AFRP_N	152	305	39.20	-	1.54	0.013	115	3732	0.51	3	118.00	4.78	2.970	0.917	0.990	LSG	ASG
Nanni and Bradford [130]	AFRP_N	150	300	35.60	-	6.46	0.104	62	1150	3.80	2	192.21	9.63	-	-	-	N/A	ADF
Nanni and Bradford [130]	AFRP_N	150	300	35.60	-	6.46	0.104	62	1150	3.80	2	186.35	6.78	-	-	-	N/A	ADF
Ozbakkaloglu and Akin [136]	AFRP_N	152	305	39.00	-	1.27	0.011	120	2900	0.40	2	69.20	2.32	1.710	-	0.684	LSG	ASG
Ozbakkaloglu and Akin [136]	AFRP_N	152	305	39.00	-	1.27	0.011	120	2900	0.40	2	67.10	2.30	1.560	-	0.624	LSG	ASG
Ozbakkaloglu and Akin [136]	AFRP_N	152	305	39.00	-	1.90	0.016	120	2900	0.60	3	87.60	3.11	1.840	-	0.736	LSG	ASG
Ozbakkaloglu and Akin [136]	AFRP_N	152	305	39.00	-	1.90	0.016	120	2900	0.60	3	85.00	2.86	1.660	-	0.664	LSG	ASG
Rochette and Labossiére [85]	AFRP_N	150	300	43.00	-	0.46	0.034	14	230	1.27	1	47.30	1.11	1.550	0.917	-	LSG	ADF
Rochette and Labossiére [85]	AFRP_N	150	300	43.00	-	0.94	0.069	14	230	2.56	2	58.90	1.47	1.390	0.822	-	LSG	ADF
Rochette and Labossiére [85]	AFRP_N	150	300	43.00	-	1.44	0.106	14	230	3.86	3	71.00	1.69	1.330	0.786	-	LSG	ADF
Rochette and Labossiére [85]	AFRP_N	150	300	43.00	-	1.96	0.144	14	230	5.21	4	74.40	1.74	1.180	0.698	-	LSG	ADF
Suter and Pinzelli [94]	AFRP_N	150	300	44.70	-	0.59	0.019	31	602	0.70	1	52.23	0.24	-	-	-	N/A	N/A
Suter and Pinzelli [94]	AFRP_N	150	300	44.70	-	1.18	0.038	31	602	1.40	2	76.85	1.14	-	-	-	N/A	N/A
Suter and Pinzelli [94]	AFRP_N	150	300	44.70	-	1.77	0.057	31	602	2.10	3	103.45	1.30	-	-	-	N/A	N/A
Suter and Pinzelli [94]	AFRP_N	150	300	44.70	-	2.37	0.076	31	602	2.80	4	136.89	1.78	-	-	-	N/A	N/A
Suter and Pinzelli [94]	AFRP_N	150	300	36.20	-	0.59	0.019	31	602	0.70	1	48.15	0.66	-	-	-	N/A	N/A
Suter and Pinzelli [94]	AFRP_N	150	300	36.20	-	1.18	0.038	31	602	1.40	2	75.30	1.01	-	-	-	N/A	N/A
Suter and Pinzelli [94]	AFRP_N	150	300	36.20	-	1.77	0.057	31	602	2.10	3	98.46	1.30	-	-	-	N/A	N/A
Suter and Pinzelli [94]	AFRP_N	150	300	33.30	-	0.59	0.019	31	602	0.70	1	50.28	0.79	-	-	-	N/A	N/A
Suter and Pinzelli [94]	AFRP_N	150	300	33.30	-	1.18	0.038	31	602	1.40	2	78.59	1.30	-	-	-	N/A	N/A

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	*D* (mm)	*H* (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Suter and Pinzelli [94]	AFRP_N	150	300	33.30	-	1.77	0.057	31	602	2.10	3	103.90	1.50	-	-	-	N/A	N/A
Suter and Pinzelli [94]	AFRP_N	150	300	54.00	-	0.59	0.019	31	602	0.70	1	61.56	0.34	-	-	-	N/A	N/A
Suter and Pinzelli [94]	AFRP_N	150	300	54.00	-	1.18	0.038	31	602	1.40	2	84.24	0.64	-	-	-	N/A	N/A
Suter and Pinzelli [94]	AFRP_N	150	300	54.00	-	1.77	0.057	31	602	2.10	3	111.24	0.82	-	-	-	N/A	N/A
Vincent and Ozbakkaloglu [137]	AFRP_N	152	305	49.40	0.24	1.90	0.016	120	2900	0.60	3	109.00	3.73	2.500	-	1.016	LSG	ASG
Vincent and Ozbakkaloglu [137]	AFRP_N	152	305	49.40	0.24	1.90	0.016	120	2900	0.60	3	103.40	3.40	2.100	-	0.839	LSG	ASG
Vincent and Ozbakkaloglu [137]	AFRP_N	152	305	49.40	0.24	1.90	0.016	120	2900	0.60	3	105.30	3.37	2.080	-	0.831	LSG	ASG
Vincent and Ozbakkaloglu [137]	AFRP_N	152	305	49.40	0.24	1.90	0.016	120	2900	0.60	3	107.70	3.41	2.180	-	0.873	LSG	ASG
Vincent and Ozbakkaloglu [137]	AFRP_N	152	305	49.40	0.24	1.90	0.016	120	2900	0.60	3	104.00	3.22	2.120	-	0.848	LSG	ASG
Vincent and Ozbakkaloglu [137]	AFRP_N	152	305	49.40	0.24	1.90	0.016	120	2900	0.60	3	110.10	3.48	2.220	-	0.888	LSG	ASG
Wang and Wu [138]	AFRP_N	70	210	51.63	0.25	0.38	0.003	118	2060	0.06	1	65.97	0.40	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	70	210	51.63	0.25	0.64	0.005	118	2060	0.10	2	72.63	0.53	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	70	210	51.63	0.25	1.29	0.011	118	2060	0.19	4	111.43	0.57	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	105	315	50.64	0.24	0.32	0.003	118	2060	0.07	1	59.48	0.33	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	105	315	50.64	0.24	0.64	0.005	118	2060	0.14	2	62.69	0.39	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	105	315	50.64	0.24	1.29	0.011	118	2060	0.29	4	96.02	0.42	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	194	582	44.92	0.26	0.35	0.003	118	2060	0.14	1	44.00	0.36	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	194	582	44.92	0.26	0.70	0.006	118	2060	0.29	2	58.75	0.39	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	194	582	44.92	0.26	1.40	0.012	118	2060	0.57	4	106.03	0.46	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	70	210	29.37	0.20	0.64	0.005	118	2060	0.10	2	49.64	0.54	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	70	210	29.37	0.20	0.38	0.003	118	2060	0.06	1	41.80	0.36	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	70	210	29.37	0.20	1.29	0.011	118	2060	0.19	4	86.07	0.95	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	105	315	28.79	0.20	0.32	0.003	118	2060	0.07	1	41.20	0.36	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	105	315	28.79	0.20	0.64	0.005	118	2060	0.14	2	47.77	0.58	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	105	315	28.79	0.20	1.29	0.011	118	2060	0.29	4	87.42	1.15	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	194	582	23.98	0.21	0.35	0.003	118	2060	0.14	1	33.84	0.38	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	194	582	23.98	0.21	0.70	0.006	118	2060	0.29	2	43.90	0.51	-	-	-	N/A	N/A
Wang and Wu [138]	AFRP_N	194	582	23.98	0.21	1.40	0.012	118	2060	0.57	4	80.86	0.93	-	-	-	N/A	N/A
Wang and Zhang [139]	AFRP_N	150	450	47.30	-	1.81	0.015	118	2060	0.57	4	84.30	1.62	-	-	-	N/A	ASG
Wang and Zhang [139]	AFRP_N	150	450	51.10	-	1.81	0.015	118	2060	0.57	4	88.65	1.45	-	-	-	N/A	ASG
Watanabe et al. [104]	AFRP_N	100	200	30.20	0.23	0.56	0.006	97	2589	0.15	1	39.00	1.58	2.360	0.885	0.502	N/A	N/A
Watanabe et al. [104]	AFRP_N	100	200	30.20	0.23	1.02	0.012	87	2707	0.29	2	68.50	4.74	3.090	0.997	0.657	N/A	N/A
Watanabe et al. [104]	AFRP_N	100	200	30.20	0.23	1.51	0.017	87	2667	0.43	3	92.10	5.55	2.650	0.867	0.564	N/A	N/A
Wu et al. [106]	AFRP_N	150	300	23.00	-	0.88	0.008	115	2324	0.29	2	53.00	-	-	-	-	LSG	ADF
Wu et al. [106]	AFRP_N	150	300	23.10	0.27	0.88	0.008	115	2324	0.29	2	45.20	2.31	-	-	-	LSG	ADF
Wu et al. [106]	AFRP_N	150	300	23.10	0.27	0.88	0.008	115	2324	0.29	2	50.70	3.03	-	-	-	LSG	ADF
Wu et al. [106]	AFRP_N	150	300	23.10	0.27	0.88	0.008	115	2324	0.29	2	53.70	3.29	-	-	-	LSG	ADF
Wu et al. [106]	AFRP_N	100	300	46.40	0.26	1.35	0.011	118	2060	0.29	2	78.26	0.90	-	-	-	N/A	ASG
Wu et al. [106]	AFRP_N	100	300	46.40	0.26	2.72	0.023	118	2060	0.57	4	128.49	1.88	-	-	-	N/A	ASG
Bullo [121]	HM_UHM_CFRP_N	150	300	32.54	0.25	1.72	0.004	390	3000	0.17	1	52.63	0.83	0.467	-	0.607	N/A	N/A
Bullo [121]	HM_UHM_CFRP_N	150	300	32.54	0.25	1.72	0.004	390	3000	0.17	1	56.59	0.93	0.520	-	0.676	N/A	N/A
Bullo [121]	HM_UHM_CFRP_N	150	300	32.54	0.25	1.72	0.004	390	3000	0.17	1	61.11	0.83	0.421	-	0.547	N/A	N/A
Bullo [121]	HM_UHM_CFRP_N	150	300	32.54	0.25	5.16	0.013	390	3000	0.50	3	97.33	1.82	0.639	-	0.831	N/A	N/A
Bullo [121]	HM_UHM_CFRP_N	150	300	32.54	0.25	5.16	0.013	390	3000	0.50	3	83.75	1.27	0.439	-	0.571	N/A	N/A
Bullo [121]	HM_UHM_CFRP_N	150	300	32.54	0.25	5.16	0.013	390	3000	0.50	3	100.16	1.69	0.539	-	0.701	N/A	N/A

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Cui and Sheikh [46]	HM_UHM_CFRP_N	152	305	45.70	0.24	1.84	0.004	436	3314	0.16	1	67.50	1.11	0.789	-	1.038	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_N	152	305	45.70	0.24	1.84	0.004	436	3314	0.16	1	64.10	1.03	0.769	-	1.012	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_N	152	305	45.70	0.24	3.79	0.009	436	3314	0.33	2	84.20	1.33	0.642	-	0.845	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_N	152	305	45.70	0.24	3.79	0.009	436	3314	0.33	2	83.10	1.23	0.634	-	0.834	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_N	152	305	45.70	0.24	5.64	0.013	436	3314	0.49	3	99.70	1.56	0.603	-	0.793	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_N	152	305	45.70	0.24	5.64	0.013	436	3314	0.49	3	94.90	1.43	0.546	-	0.718	LSG	ADM
Dias da Silva and Santos [49]	HM_UHM_CFRP_N	150	600	28.20	-	1.77	0.005	390	3000	0.17	1	41.50	0.75	0.370	-	0.481	LSG	ASG
Dias da Silva and Santos [49]	HM_UHM_CFRP_N	150	600	28.20	-	3.44	0.009	390	3000	0.33	2	65.60	1.81	0.690	-	0.897	LSG	ASG
Dias da Silva and Santos [49]	HM_UHM_CFRP_N	150	600	28.20	-	5.22	0.013	390	3000	0.50	3	79.40	1.69	0.640	-	0.832	LSG	ASG
Hosotani et al. [55]	HM_UHM_CFRP_N	200	600	41.70	0.34	5.96	0.014	439	3972	0.68	1	90.00	1.50	-	-	-	N/A	ADF
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	25.20	0.31	1.71	0.005	377	4410	0.17	1	41.60	1.44	0.695	-	0.594	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	25.20	0.31	1.71	0.005	377	4410	0.17	1	38.80	1.21	0.581	-	0.497	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	25.20	0.31	3.43	0.009	377	4410	0.34	2	60.10	1.88	0.641	-	0.548	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	25.20	0.31	3.43	0.009	377	4410	0.34	2	55.90	2.10	0.551	-	0.471	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	25.20	0.31	5.14	0.014	377	4410	0.51	3	67.00	2.45	0.449	-	0.384	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	25.20	0.31	5.14	0.014	377	4410	0.51	3	67.30	2.43	0.368	-	0.315	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	47.40	0.31	1.71	0.005	377	4410	0.17	1	72.30	1.09	0.772	-	0.660	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	47.40	0.31	1.71	0.005	377	4410	0.17	1	64.40	0.87	0.513	-	0.439	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	47.40	0.31	3.43	0.009	377	4410	0.34	2	82.40	1.40	0.656	-	0.561	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	47.40	0.31	3.43	0.009	377	4410	0.34	2	82.40	1.35	0.537	-	0.459	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	47.40	0.31	5.14	0.014	377	4410	0.51	3	96.30	1.59	0.443	-	0.379	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	47.40	0.31	5.14	0.014	377	4410	0.51	3	95.20	1.69	0.578	-	0.494	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	51.80	0.30	1.71	0.005	377	4410	0.17	1	78.70	0.75	0.543	-	0.464	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	51.80	0.30	1.71	0.005	377	4410	0.17	1	72.80	0.66	0.398	-	0.340	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	51.80	0.30	3.43	0.009	377	4410	0.34	2	95.40	1.05	0.551	-	0.471	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	51.80	0.30	3.43	0.009	377	4410	0.34	2	90.70	1.00	0.364	-	0.311	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	51.80	0.30	5.14	0.014	377	4410	0.51	3	110.50	1.29	0.438	-	0.374	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	51.80	0.30	5.14	0.014	377	4410	0.51	3	103.60	1.20	0.310	-	0.265	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	51.80	0.30	8.59	0.023	377	4410	0.85	5	112.70	1.59	0.289	-	0.247	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_N	150	300	51.80	0.30	8.59	0.023	377	4410	0.85	5	126.70	1.61	0.360	-	0.308	LSG	ASG
Matthys et al. [75]	HM_UHM_CFRP_N	150	300	34.90	0.21	2.69	0.006	420	1100	0.24	1	40.70	0.36	0.180	-	-	LSG	ASG
Matthys et al. [75]	HM_UHM_CFRP_N	150	300	34.90	0.21	4.02	0.006	640	2650	0.24	2	41.30	0.40	0.190	0.829	0.459	LSG	ASG
Suter and Pinzelli [94]	HM_UHM_CFRP_N	150	300	44.70	-	6.50	0.010	640	2650	0.38	3	91.98	0.53	-	-	-	N/A	N/A
Toutanji [98]	HM_UHM_CFRP_N	76	152	30.90	-	6.51	0.017	373	2940	0.33	3	94.00	-	-	-	-	LSG	ASG
Watanabe et al. [104]	HM_UHM_CFRP_N	100	200	30.20	0.23	3.52	0.006	628	1579	0.14	1	41.70	0.57	0.230	0.916	0.598	N/A	N/A
Watanabe et al. [104]	HM_UHM_CFRP_N	100	200	30.20	0.23	7.06	0.011	629	1824	0.28	2	56.00	0.88	0.220	0.759	0.572	N/A	N/A
Watanabe et al. [104]	HM_UHM_CFRP_N	100	200	30.20	0.23	9.72	0.017	576	1285	0.42	3	63.30	1.30	0.220	0.987	0.572	N/A	N/A
Wu et al. [106]	HM_UHM_CFRP_N	150	300	23.00	0.27	4.30	0.008	563	2544	0.29	2	50.00	-	-	-	-	LSG	ADF
Wu et al. [106]	HM_UHM_CFRP_N	150	300	23.10	0.27	4.30	0.008	563	2544	0.29	2	50.50	1.27	-	-	-	LSG	ADF
Wu et al. [106]	HM_UHM_CFRP_N	150	300	23.10	0.27	4.30	0.008	563	2544	0.29	2	48.90	1.20	-	-	-	LSG	ADF
Toutanji H. A. [112]	HM_UHM_CFRP_N	76	305	30.93	0.20	6.50	0.017	373	2940	0.33	2	94.01	1.55	0.550	-	0.355	LSG	ASG
Toutanji and Balaguru [115]	HM_UHM_CFRP_N	76	305	31.80	0.20	6.51	0.017	373	2940	0.33	2	96.00	1.60	-	-	-	LSG	ASG
Aire et al. [30]	CFRP_H	150	300	69.00	0.24	0.75	0.003	240	3900	0.12	1	94.00	0.27	0.090	-	0.055	LSG	ASG
Aire et al. [30]	CFRP_H	150	300	69.00	0.24	2.25	0.009	240	3900	0.35	3	98.00	0.78	0.820	-	0.505	LSG	ASG
Aire et al. [30]	CFRP_H	150	300	69.00	0.24	4.51	0.019	240	3900	0.70	6	156.00	1.63	1.030	-	0.634	LSG	ASG
Aire et al. [30]	CFRP_H	150	300	69.00	0.24	6.79	0.028	240	3900	1.05	9	199.00	2.28	1.140	-	0.702	LSG	ASG

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	*D* (mm)	*H* (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Aire et al. [30]	CFRP_H	150	300	69.00	0.24	9.07	0.038	240	3900	1.40	12	217.00	2.39	0.850	-	0.523	LSG	ASG
Benzaid et al. [38]	CFRP_H	160	320	61.81	0.28	0.77	0.003	238	4300	0.13	1	62.68	0.33	0.246	-	0.136	LSG	ASG
Benzaid et al. [38]	CFRP_H	160	320	61.81	0.28	2.33	0.010	238	4300	0.39	3	93.19	1.05	1.289	-	0.713	LSG	ASG
Berthet et al. [39]	CFRP_H	70	140	112.60	0.23	4.36	0.019	230	3200	0.33	3	141.10	0.45	0.712	-	0.512	LSG	ASG
Berthet et al. [39]	CFRP_H	70	140	112.60	0.23	4.36	0.019	230	3200	0.33	3	143.10	0.49	0.738	-	0.530	LSG	ASG
Berthet et al. [39]	CFRP_H	70	140	112.60	0.23	10.90	0.047	230	3200	0.82	8	189.50	0.72	0.754	-	0.542	LSG	ASG
Berthet et al. [39]	CFRP_H	70	140	112.60	0.23	10.90	0.047	230	3200	0.82	8	187.90	0.70	0.728	-	0.523	LSG	ASG
Berthet et al. [39]	CFRP_H	70	140	169.70	0.32	4.36	0.019	230	3200	0.33	3	186.40	0.67	0.459	-	0.330	LSG	ASG
Berthet et al. [39]	CFRP_H	70	140	169.70	0.32	13.20	0.057	230	3200	0.99	9	296.40	1.02	0.799	-	0.574	LSG	ASG
Chikh et al. [141]	CFRP_H	160	320	61.80	0.28	0.77	0.003	238	4300	0.13	1	62.68	0.32	-	-	-	LSG	ASG
Chikh et al. [141]	CFRP_H	160	320	61.80	0.28	2.33	0.010	238	4300	0.39	3	93.19	1.05	-	-	-	LSG	ASG
Cui and Sheikh [46]	CFRP_H	152	305	79.90	0.24	2.25	0.026	85	816	1.00	1	94.80	0.53	1.097	1.143	-	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	79.90	0.24	2.25	0.026	85	816	1.00	1	105.30	0.74	0.917	0.955	-	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	79.90	0.24	4.53	0.053	85	816	2.00	2	142.10	1.13	0.985	1.026	-	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	79.90	0.24	4.53	0.053	85	816	2.00	2	140.80	0.97	1.099	1.145	-	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	79.90	0.24	6.84	0.081	85	816	3.00	3	172.90	1.48	0.975	1.016	-	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	79.90	0.24	6.84	0.081	85	816	3.00	3	181.80	1.47	1.113	1.159	-	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	110.60	0.26	2.25	0.026	85	816	1.00	1	146.60	0.52	1.029	1.072	-	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	110.60	0.26	2.25	0.026	85	816	1.00	1	149.20	0.55	0.855	0.891	-	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	110.60	0.26	6.84	0.081	85	816	3.00	3	198.40	0.84	0.867	0.903	-	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	110.60	0.26	6.84	0.081	85	816	3.00	3	182.30	0.73	0.746	0.777	-	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	85.60	0.26	0.70	0.003	241	3639	0.11	1	95.40	0.44	0.823	-	0.545	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	85.60	0.26	0.70	0.003	241	3639	0.11	1	89.80	0.44	0.758	-	0.502	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	85.60	0.26	1.40	0.006	241	3639	0.22	2	96.00	0.56	0.736	-	0.487	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	85.60	0.26	1.40	0.006	241	3639	0.22	2	94.50	0.58	0.763	-	0.505	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	85.60	0.26	2.80	0.012	241	3639	0.44	4	125.40	1.00	0.886	-	0.587	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	85.60	0.26	2.80	0.012	241	3639	0.44	4	126.50	0.99	0.924	-	0.612	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	111.80	0.26	1.40	0.006	241	3639	0.22	2	134.10	0.32	0.937	-	0.621	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	111.80	0.26	1.40	0.006	241	3639	0.22	2	135.70	0.48	0.825	-	0.546	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	111.80	0.26	3.50	0.015	241	3639	0.55	5	152.10	0.50	0.753	-	0.499	LSG	ADM
Cui and Sheikh [46]	CFRP_H	152	305	111.80	0.26	3.50	0.015	241	3639	0.55	5	153.30	0.58	0.597	-	0.395	LSG	ADM
Green [142]	CFRP_H	152	305	59.00	—	1.86	0.026	70	881	1.00	1	70.00	0.00	-	-	-	N/A	N/A
Harmon and Slattery [53]	CFRP_H	51	102	103.00	—	3.31	0.014	235	3500	0.18	1	131.10	1.10	1.020	-	0.685	N/A	N/A
Harmon and Slattery [53]	CFRP_H	51	102	103.00	—	6.38	0.027	235	3500	0.34	2	193.20	2.10	0.720	-	0.483	N/A	N/A
Harmon and Slattery [53]	CFRP_H	51	102	103.00	—	12.87	0.055	235	3500	0.69	4	303.60	3.40	0.560	-	0.376	N/A	N/A
Li, Wu and Gravina [71]	CFRP_H	150	300	60.50	0.26	1.08	0.004	242	4338	0.17	1	72.70	0.73	-	-	-	LDICT	ADICT
Li, Wu and Gravina [71]	CFRP_H	150	300	60.50	0.26	1.08	0.004	242	4338	0.17	1	76.70	0.70	-	-	-	LDICT	ADICT
Mandal and Fam [143]	CFRP_H	100	200	80.60	0.22	1.52	0.032	47	784	0.80	4	96.40	0.31	-	-	-	N/A	N/A
Mandal and Fam [143]	CFRP_H	100	200	80.60	0.22	1.52	0.032	47	784	0.80	4	104.60	0.35	-	-	-	N/A	N/A
Mandal and Fam [143]	CFRP_H	100	200	80.60	0.22	1.52	0.032	47	784	0.80	4	100.40	0.33	-	-	-	N/A	N/A
Mandal and Fam [143]	CFRP_H	100	200	67.03	0.22	1.52	0.032	47	784	0.80	4	90.50	0.34	-	-	-	N/A	N/A
Mandal and Fam [143]	CFRP_H	100	200	67.03	0.22	1.52	0.032	47	784	0.80	4	85.90	0.30	-	-	-	N/A	N/A
Mandal and Fam [143]	CFRP_H	100	200	67.03	0.22	1.52	0.032	47	784	0.80	4	93.60	0.32	-	-	-	N/A	N/A
Miyauchi et al. [77]	CFRP_H	100	200	109.50	0.29	1.02	0.004	231	3481	0.11	1	117.30	0.42	-	-	-	N/A	ASG

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Miyauchi et al. [77]	CFRP_H	100	200	109.50	0.29	2.03	0.009	231	3481	0.22	2	122.50	0.55	-	-	-	N/A	ASG
Owen [80]	CFRP_H	298	610	58.10	—	4.24	0.018	238	4200	1.32	7	60.00	0.76	0.950	0.538	0.593	N/A	N/A
Owen [80]	CFRP_H	298	610	58.10	—	4.24	0.018	238	4200	1.32	4	84.80	1.22	0.990	0.561	0.618	N/A	N/A
Owen [80]	CFRP_H	298	610	58.10	—	4.24	0.018	238	4200	1.32	2	150.20	2.89	1.310	0.742	0.817	N/A	N/A
Shehata et al. [90]	CFRP_H	150	300	61.70	0.18	1.04	0.004	235	3550	0.17	1	76.40	0.60	-	-	-	LSG	ASG
Shehata et al. [90]	CFRP_H	150	300	61.70	0.18	2.07	0.009	235	3550	0.33	3	97.30	0.87	-	-	-	LSG	ASG
Touhari and Mitiche-Kettab [97]	CFRP_H	160	320	61.50	0.30	0.86	0.025	34	403	1.00	1	80.00	1.09	1.190	0.850	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_H	160	320	61.50	0.30	0.86	0.025	34	403	1.00	1	78.90	0.98	1.060	0.757	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_H	160	320	61.50	0.30	0.86	0.025	34	403	1.00	1	81.10	0.97	1.170	0.836	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_H	160	320	61.50	0.30	1.72	0.051	34	403	2.00	2	96.00	1.16	1.080	0.771	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_H	160	320	61.50	0.30	1.72	0.051	34	403	2.00	2	99.40	1.37	1.110	0.793	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_H	160	320	61.50	0.30	1.72	0.051	34	403	2.00	2	98.20	1.49	1.190	0.850	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_H	160	320	61.50	0.30	2.60	0.076	34	403	3.00	3	104.99	1.56	0.930	0.664	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_H	160	320	61.50	0.30	2.60	0.076	34	403	3.00	3	117.14	1.78	1.180	0.843	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	CFRP_H	160	320	61.50	0.30	2.60	0.076	34	403	3.00	3	105.44	1.59	1.010	0.721	-	LDL	ASG
Valdmanis et al. [99]	CFRP_H	150	300	61.60	0.18	0.91	0.005	201	1906	0.17	1	80.50	0.27	0.180	0.189	0.094	LSG	ASG
Valdmanis et al. [99]	CFRP_H	150	300	61.60	0.18	2.10	0.009	231	2389	0.34	2	95.30	0.32	0.160	0.155	0.083	LSG	ASG
Valdmanis et al. [99]	CFRP_H	150	300	61.60	0.18	3.22	0.014	236	2661	0.51	3	104.90	0.36	0.320	0.284	0.166	LSG	ASG
Xiao et al. [144]	CFRP_H	152	305	70.80	0.32	2.13	0.009	238	2738	0.34	2	104.20	1.07	1.100	0.955	-	LSG	ASG
Xiao et al. [144]	CFRP_H	152	305	70.80	0.32	2.13	0.009	238	2738	0.34	2	110.30	1.43	1.150	0.999	-	LSG	ASG
Xiao et al. [144]	CFRP_H	152	305	70.80	0.32	6.43	0.027	238	2738	1.02	6	180.50	2.16	1.000	0.869	-	LSG	ASG
Xiao et al. [144]	CFRP_H	152	305	70.80	0.32	6.43	0.027	238	2738	1.02	6	197.70	2.33	0.900	0.782	-	LSG	ASG
Xiao et al. [144]	CFRP_H	152	305	70.80	0.32	10.76	0.045	238	2738	1.70	10	191.50	2.28	0.670	0.582	-	LSG	ASG
Xiao et al. [144]	CFRP_H	152	305	70.80	0.32	10.76	0.045	238	2738	1.70	10	162.40	1.39	0.520	0.452	-	LSG	ASG
Xiao et al. [144]	CFRP_H	152	305	111.60	0.34	4.27	0.018	238	2738	0.68	4	141.20	0.97	0.570	0.495	-	LSG	ASG
Xiao et al. [144]	CFRP_H	152	305	111.60	0.34	4.27	0.018	238	2738	0.68	4	134.00	0.75	0.580	0.504	-	LSG	ASG
Xiao et al. [144]	CFRP_H	152	305	111.60	0.34	6.43	0.027	238	2738	1.02	6	170.40	0.98	0.520	0.452	-	LSG	ASG
Xiao et al. [144]	CFRP_H	152	305	111.60	0.34	6.43	0.027	238	2738	1.02	6	176.60	1.12	0.600	0.521	-	LSG	ASG
Xiao et al. [144]	CFRP_H	152	305	111.60	0.34	10.76	0.045	238	2738	1.70	10	217.30	1.56	0.560	0.486	-	LSG	ASG
Xiao et al. [144]	CFRP_H	152	305	111.60	0.34	10.76	0.045	238	2738	1.70	10	217.10	1.60	0.570	0.495	-	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152	305	64.50	0.27	0.74	0.003	240	3800	0.12	1	65.60	0.59	0.930	-	0.600	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152	305	64.50	0.27	0.74	0.003	240	3800	0.12	1	68.70	0.57	0.810	-	0.523	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152	305	62.90	0.27	0.74	0.003	240	3800	0.12	1	66.30	0.65	0.980	-	0.632	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152	305	64.50	0.27	1.48	0.006	240	3800	0.23	2	72.30	0.93	1.250	-	0.806	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152	305	62.40	0.27	1.48	0.006	240	3800	0.23	2	68.40	0.71	0.940	-	0.606	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152	305	64.20	0.27	1.48	0.006	240	3800	0.23	2	68.20	0.82	1.080	-	0.697	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152	305	64.50	0.27	2.22	0.009	240	3800	0.35	3	85.90	1.19	1.070	-	0.690	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152	305	64.50	0.27	2.22	0.009	240	3800	0.35	3	80.30	1.00	1.010	-	0.652	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152	305	64.50	0.27	2.96	0.012	240	3800	0.47	4	99.40	1.38	1.110	-	0.716	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152	305	62.40	0.27	2.96	0.012	240	3800	0.47	4	101.30	1.41	0.980	-	0.632	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152	305	65.80	0.27	2.96	0.012	240	3800	0.47	4	104.30	1.36	1.030	-	0.665	LSG	ASG
Ozbakkaloglu and Vincent [136]	CFRP_H	152	305	108.00	0.35	2.96	0.012	240	3800	0.47	4	103.30	0.96	0.810	-	0.523	LSG	ASG
Ozbakkaloglu and Vincent [100]	CFRP_H	152	305	112.00	0.36	3.71	0.015	240	3800	0.59	5	121.20	1.09	0.800	-	0.516	LSG	ASG
Ozbakkaloglu and Vincent [136]	CFRP_H	152	305	110.00	0.35	4.45	0.019	240	3800	0.70	6	122.30	1.13	0.940	-	0.606	LSG	ASG
Ahmad et al. [118]	GFRP_H	102	203	64.20	0.27	1.68	0.035	48	2070	0.88	2	145.60	-	-	-	-	N/A	N/A

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Aire et al. [145]	GFRP_H	150	300	69.00	0.24	0.26	0.004	65	3000	0.15	1	79.00	0.24	0.620	-	0.144	LSG	ASG
Aire et al. [145]	GFRP_H	150	300	69.00	0.24	0.78	0.012	65	3000	0.45	3	81.00	0.26	0.740	-	0.172	LSG	ASG
Aire et al. [145]	GFRP_H	150	300	69.00	0.24	1.56	0.024	65	3000	0.89	6	107.00	0.62	1.100	-	0.256	LSG	ASG
Aire et al. [145]	GFRP_H	150	300	69.00	0.24	2.35	0.036	65	3000	1.34	9	137.00	1.42	1.050	-	0.244	LSG	ASG
Aire et al. [145]	GFRP_H	150	300	69.00	0.24	3.14	0.048	65	3000	1.79	12	170.00	1.46	1.110	-	0.258	LSG	ASG
Almusallam [119]	GFRP_H	150	300	60.00	0.30	0.94	0.035	27	540	1.30	1	62.40	0.52	0.491	-	0.246	LDL	ADM
Almusallam [119]	GFRP_H	150	300	60.00	0.30	2.88	0.107	27	540	3.90	3	99.60	1.60	0.698	-	0.349	LDL	ADM
Almusallam [119]	GFRP_H	150	300	80.80	0.27	0.94	0.035	27	540	1.30	1	88.90	0.37	0.239	-	0.120	LDL	ADM
Almusallam [119]	GFRP_H	150	300	80.80	0.27	2.88	0.107	27	540	3.90	3	100.90	0.69	0.869	-	0.435	LDL	ADM
Almusallam [119]	GFRP_H	150	300	90.30	0.32	0.94	0.035	27	540	1.30	1	97.00	0.32	0.253	-	0.127	LDL	ADM
Almusallam [119]	GFRP_H	150	300	90.30	0.32	2.88	0.107	27	540	3.90	3	110.00	0.90	0.825	-	0.413	LDL	ADM
Almusallam [119]	GFRP_H	150	300	107.80	0.26	0.94	0.035	27	540	1.30	1	116.00	0.28	0.310	-	0.155	LDL	ADM
Almusallam [119]	GFRP_H	150	300	107.80	0.26	2.88	0.107	27	540	3.90	3	125.20	0.32	0.307	-	0.154	LDL	ADM
Benzaid et al. [146]	GFRP_H	160	320	56.70	0.24	0.26	0.011	24	383	0.44	1	74.00	1.12	1.140	-	0.708	LDL	ADM
Benzaid et al. [146]	GFRP_H	160	320	56.70	0.24	0.53	0.022	24	383	0.88	2	84.00	1.28	1.150	-	0.715	LDL	ADM
Benzaid et al. [146]	GFRP_H	160	320	56.70	0.24	1.06	0.044	24	383	1.76	4	95.50	1.88	1.260	-	0.783	LDL	ADM
Cui and Sheikh [46]	GFRP_H	152	305	79.90	0.24	0.73	0.033	22	508	1.25	1	85.40	0.76	2.018	0.855	-	LSG	ADM
Cui and Sheikh [46]	GFRP_H	152	305	79.90	0.24	0.73	0.033	22	508	1.25	1	89.00	0.88	2.360	1.000	-	LSG	ADM
Cui and Sheikh [46]	GFRP_H	152	305	79.90	0.24	1.47	0.067	22	508	2.50	2	92.50	0.86	1.389	0.589	-	LSG	ADM
Cui and Sheikh [46]	GFRP_H	152	305	79.90	0.24	1.47	0.067	22	508	2.50	2	94.10	0.78	1.694	0.718	-	LSG	ADM
Cui and Sheikh [46]	GFRP_H	152	305	79.90	0.24	2.22	0.101	22	508	3.75	3	120.80	1.26	2.008	0.851	-	LSG	ADM
Cui and Sheikh [46]	GFRP_H	152	305	79.90	0.24	2.22	0.101	22	508	3.75	3	126.10	1.18	1.916	0.812	-	LSG	ADM
Cui and Sheikh [46]	GFRP_H	152	305	79.90	0.24	2.85	0.136	21	496	5.00	4	174.60	-	-	-	-	LSG	ADM
Cui and Sheikh [46]	GFRP_H	152	305	110.60	0.26	1.47	0.067	22	508	2.50	2	144.30	0.67	1.192	0.505	-	LSG	ADM
Cui and Sheikh [46]	GFRP_H	152	305	110.60	0.26	1.47	0.067	22	508	2.50	2	143.50	0.46	1.080	0.458	-	LSG	ADM
Cui and Sheikh [46]	GFRP_H	152	305	110.60	0.26	2.99	0.136	22	508	5.00	4	174.60	0.95	1.398	0.592	-	LSG	ADM
Cui and Sheikh [46]	GFRP_H	152	305	110.60	0.26	2.99	0.136	22	508	5.00	4	172.90	1.28	1.538	0.652	-	LSG	ADM
Green [142]	GFRP_H	152	305	59.00	-	1.80	0.053	34	748	2.00	2	73.00	-	-	-	-	N/A	N/A
Lim and Ozbakkaloblu [127]	GFRP_H	152.5	305	73.00	0.26	2.01	0.021	95	3055	0.80	4	136.00	2.69	2.450	0.763	0.700	LSG	ADM
Lim and Ozbakkaloblu [127]	GFRP_H	152.5	305	73.00	0.26	2.01	0.021	95	3055	0.80	4	138.70	2.74	2.460	0.766	0.703	LSG	ADM
Lim and Ozbakkaloblu [127]	GFRP_H	152.5	305	73.00	0.26	2.01	0.021	95	3055	0.80	4	136.30	2.61	2.230	0.695	0.637	LSG	ADM
Mandal and Fam [143]	GFRP_H	100	200	80.60	0.22	1.37	0.053	26	575	1.30	1	100.40	0.44	-	-	-	N/A	N/A
Mandal and Fam [143]	GFRP_H	100	200	80.60	0.22	1.37	0.053	26	575	1.30	1	96.30	0.30	-	-	-	N/A	N/A
Mandal and Fam [143]	GFRP_H	100	200	80.60	0.22	1.37	0.053	26	575	1.30	1	111.50	0.37	-	-	-	N/A	N/A
Mandal and Fam [143]	GFRP_H	100	200	67.03	0.22	1.37	0.053	26	575	1.30	1	86.70	0.31	-	-	-	N/A	N/A
Mandal and Fam [143]	GFRP_H	100	200	67.03	0.22	1.37	0.053	26	575	1.30	1	81.30	0.29	-	-	-	N/A	N/A
Mandal and Fam [143]	GFRP_H	100	200	67.03	0.22	1.37	0.053	26	575	1.30	1	92.40	0.34	-	-	-	N/A	N/A
Mandal and Fam [143]	GFRP_H	100	200	80.60	0.22	2.78	0.107	26	575	2.60	2	98.30	0.36	-	-	-	N/A	N/A
Mandal and Fam [143]	GFRP_H	100	200	80.60	0.22	2.78	0.107	26	575	2.60	2	95.80	0.37	-	-	-	N/A	N/A
Mandal and Fam [143]	GFRP_H	100	200	80.60	0.22	2.78	0.107	26	575	2.60	2	101.00	0.32	-	-	-	N/A	N/A
Mandal and Fam [143]	GFRP_H	100	200	67.03	0.22	2.78	0.107	26	575	2.60	2	97.50	0.32	-	-	-	N/A	N/A
Mandal and Fam [143]	GFRP_H	100	200	67.03	0.22	2.78	0.107	26	575	2.60	2	97.60	0.36	-	-	-	N/A	N/A
Mandal and Fam [143]	GFRP_H	100	200	67.03	0.22	2.78	0.107	26	575	2.60	2	89.90	0.45	-	-	-	N/A	N/A
Touhari and Mitiche-Kettab [97]	GFRP_H	160	320	61.70	0.31	0.65	0.025	26	325	1.00	1	69.40	0.89	1.290	0.679	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	GFRP_H	160	320	61.70	0.31	0.65	0.025	26	325	1.00	1	73.10	0.94	1.450	0.763	-	LDL	ASG

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Touhari and Mitiche-Kettab [97]	GFRP_H	160	320	61.70	0.31	0.65	0.025	26	325	1.00	1	77.50	1.11	1.600	0.842	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	GFRP_H	160	320	61.70	0.31	1.32	0.051	26	325	2.00	2	80.80	1.49	1.500	0.789	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	GFRP_H	160	320	61.70	0.31	1.32	0.051	26	325	2.00	2	76.70	1.35	1.420	0.747	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	GFRP_H	160	320	61.70	0.31	1.32	0.051	26	325	2.00	2	78.00	1.44	1.480	0.779	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	GFRP_H	160	320	61.70	0.31	1.99	0.076	26	325	3.00	3	90.10	1.71	1.350	0.711	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	GFRP_H	160	320	61.70	0.31	1.99	0.076	26	325	3.00	3	92.10	1.88	1.420	0.747	-	LDL	ASG
Touhari and Mitiche-Kettab [97]	GFRP_H	160	320	61.70	0.31	1.99	0.076	26	325	3.00	3	94.40	1.95	1.500	0.789	-	LDL	ASG
Lim and Ozbakkaloglu [127]	AFRP_H	152.5	305	73.00	0.26	2.71	0.021	129	2390	0.80	4	130.10	1.88	1.650	0.892	0.750	LSG	ADM
Lim and Ozbakkaloglu [127]	AFRP_H	152.5	305	73.00	0.26	2.71	0.021	129	2390	0.80	4	130.50	1.69	1.670	0.903	0.759	LSG	ADM
Lim and Ozbakkaloglu [127]	AFRP_H	152.5	305	73.00	0.26	2.71	0.021	129	2390	0.80	4	139.30	2.14	2.020	1.092	0.918	LSG	ADM
Lim and Ozbakkaloglu [147]	AFRP_H	152.5	305	85.67	0.24	4.08	0.032	129	2390	1.20	6	166.20	2.02	1.500	0.811	0.682	LSG	ADM
Lim and Ozbakkaloglu [147]	AFRP_H	152.5	305	85.71	0.25	4.08	0.032	129	2390	1.20	6	168.00	2.18	1.480	0.800	0.673	LSG	ADM
Lim and Ozbakkaloglu [147]	AFRP_H	152.5	305	85.60	0.24	4.08	0.032	129	2390	1.20	6	165.20	2.09	1.450	0.784	0.659	LSG	ADM
Lim and Ozbakkaloglu [147]	AFRP_H	152.5	305	112.59	0.27	4.08	0.032	129	2390	1.20	6	165.50	1.97	1.370	0.741	0.623	LSG	ADM
Lim and Ozbakkaloglu [147]	AFRP_H	152.5	305	112.27	0.27	4.08	0.032	129	2390	1.20	6	168.40	1.74	1.480	0.800	0.673	LSG	ADM
Lim and Ozbakkaloglu [147]	AFRP_H	152.5	305	112.48	0.27	4.08	0.032	129	2390	1.20	6	163.10	1.87	1.470	0.795	0.668	LSG	ADM
Lim and Ozbakkaloglu [147]	AFRP_H	152.5	305	121.09	0.26	4.08	0.032	129	2390	1.20	6	167.10	1.77	1.140	0.616	0.518	LSG	ADM
Lim and Ozbakkaloglu [147]	AFRP_H	152.5	305	121.20	0.26	4.08	0.032	129	2390	1.20	6	172.10	1.76	1.390	0.751	0.632	LSG	ADM
Lim and Ozbakkaloglu [147]	AFRP_H	152.5	305	121.15	0.26	4.08	0.032	129	2390	1.20	6	168.40	1.78	1.330	0.719	0.605	LSG	ADM
Lim and Ozbakkaloglu [147]	AFRP_H	152.5	305	113.72	0.26	4.08	0.032	129	2390	1.20	6	186.50	2.04	1.500	0.811	0.682	LSG	ADM
Lim and Ozbakkaloglu [147]	AFRP_H	152.5	305	113.80	0.26	4.08	0.032	129	2390	1.20	6	170.70	1.75	1.190	0.643	0.541	LSG	ADM
Lim and Ozbakkaloglu [147]	AFRP_H	152.5	305	113.69	0.26	4.08	0.032	129	2390	1.20	6	178.50	1.94	1.450	0.784	0.659	LSG	ADM
Ozbakkaloglu and Akin [136]	AFRP_H	152	305	102.00	—	2.54	0.021	120	2900	0.80	4	118.70	1.29	1.290	0.534	0.586	LSG	ASG
Ozbakkaloglu and Akin [136]	AFRP_H	152	305	100.00	—	2.54	0.021	120	2900	0.80	4	122.30	1.45	1.180	0.488	0.536	LSG	ASG
Ozbakkaloglu and Akin [136]	AFRP_H	152	305	106.00	—	3.82	0.032	120	2900	1.20	6	153.20	1.70	1.070	0.443	0.486	LSG	ASG
Ozbakkaloglu and Akin [136]	AFRP_H	152	305	106.00	—	3.82	0.032	120	2900	1.20	6	154.70	1.70	1.100	0.455	0.500	LSG	ASG
Wu et al. [148]	AFRP_H	100	300	78.50	0.45	1.35	0.011	118	2060	0.29	4	118.30	1.08	-	-	-	N/A	ASG
Wu et al. [148]	AFRP_H	100	300	78.50	0.45	2.72	0.023	118	2060	0.57	4	167.10	1.42	-	-	-	N/A	ASG
Wu et al. [148]	AFRP_H	100	300	78.50	0.45	4.08	0.035	118	2060	0.86	3	185.80	1.61	-	-	-	N/A	ASG
Wu et al. [148]	AFRP_H	100	300	101.20	0.46	1.35	0.011	118	2060	0.29	1	123.30	0.63	-	-	-	N/A	ASG
Wu et al. [148]	AFRP_H	100	300	101.20	0.46	2.72	0.023	118	2060	0.57	2	154.00	1.02	-	-	-	N/A	ASG
Wu et al. [148]	AFRP_H	100	300	101.20	0.46	4.08	0.035	118	2060	0.86	3	204.50	1.44	-	-	-	N/A	ASG
Lim et al. [147]	AFRP_H	152.5	305	85.70	0.24	4.08	0.032	129	2390	1.20	6	166.20	2.02	1.500	0.833	0.682	LSG	ASG
Lim et al. [147]	AFRP_H	152.5	305	85.70	0.24	4.08	0.032	129	2390	1.20	6	168.00	2.18	1.480	0.822	0.673	LSG	ASG
Lim et al. [147]	AFRP_H	152.5	305	85.70	0.24	4.08	0.032	129	2390	1.20	6	165.20	2.09	1.450	0.806	0.659	LSG	ASG
Cui and Sheikh [46]	HM_UHM_CFRP_H	152	305	85.60	0.26	1.84	0.004	436	3314	0.16	1	97.10	0.42	0.303	-	0.399	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_H	152	305	85.60	0.26	1.84	0.004	436	3314	0.16	1	99.70	0.54	0.417	-	0.549	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_H	152	305	85.60	0.26	3.79	0.009	436	3314	0.33	2	117.70	0.71	0.436	-	0.574	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_H	152	305	85.60	0.26	3.79	0.009	436	3314	0.33	2	117.50	0.55	0.411	-	0.541	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_H	152	305	85.60	0.26	7.49	0.017	436	3314	0.65	4	161.60	1.02	0.383	-	0.504	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_H	152	305	85.60	0.26	7.49	0.017	436	3314	0.65	4	162.60	0.95	0.377	-	0.496	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_H	152	305	111.80	0.26	3.79	0.009	436	3314	0.33	2	151.70	0.32	0.222	-	0.292	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_H	152	305	111.80	0.26	3.79	0.009	436	3314	0.33	2	148.90	0.31	0.167	-	0.220	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_H	152	305	111.80	0.26	9.46	0.022	436	3314	0.82	5	183.20	0.49	0.242	-	0.318	LSG	ADM
Cui and Sheikh [46]	HM_UHM_CFRP_H	152	305	111.80	0.26	9.46	0.022	436	3314	0.82	5	178.30	0.50	0.208	-	0.274	LSG	ADM

Table 2. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	56.90	0.30	1.71	0.005	377	4410	0.17	1	79.30	-	-	-	-	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	56.90	0.30	1.71	0.005	377	4410	0.17	1	78.70	-	-	-	-	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	70.60	0.35	1.71	0.005	377	4410	0.17	1	87.30	0.71	0.556	-	0.475	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	70.60	0.35	1.71	0.005	377	4410	0.17	1	84.00	0.65	0.529	-	0.452	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	70.60	0.35	3.43	0.009	377	4410	0.34	2	94.10	0.80	0.388	-	0.332	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	70.60	0.35	3.43	0.009	377	4410	0.34	2	98.10	0.92	0.568	-	0.486	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	70.60	0.35	5.14	0.014	377	4410	0.51	3	114.20	1.29	0.444	-	0.380	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	70.60	0.35	5.14	0.014	377	4410	0.51	3	110.40	1.22	0.421	-	0.360	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	82.10	0.32	1.71	0.005	377	4410	0.17	1	94.10	0.46	0.278	-	0.238	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	82.10	0.32	1.71	0.005	377	4410	0.17	1	96.00	0.56	0.455	-	0.389	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	82.10	0.32	3.43	0.009	377	4410	0.34	2	97.40	0.52	0.156	-	0.133	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	82.10	0.32	3.43	0.009	377	4410	0.34	2	98.90	0.44	0.140	-	0.120	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	82.10	0.32	5.14	0.014	377	4410	0.51	3	124.20	1.04	0.549	-	0.469	LSG	ASG
Rousakis and Tepfers [140]	HM_UHM_CFRP_H	150	300	82.10	0.32	5.14	0.014	377	4410	0.51	3	120.40	0.87	0.404	-	0.345	LSG	ASG
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	73.00	0.26	2.71	0.021	129	2390	0.80	4	130.10	1.88	1.650	0.892	0.750	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	73.00	0.26	2.71	0.021	129	2390	0.80	4	130.50	1.69	1.670	0.903	0.759	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	73.00	0.26	2.71	0.021	129	2390	0.80	4	139.30	2.14	2.020	1.092	0.918	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	85.67	0.24	4.08	0.032	129	2390	1.20	6	166.20	2.02	1.500	0.811	0.682	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	85.71	0.25	4.08	0.032	129	2390	1.20	6	168.00	2.18	1.480	0.800	0.673	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	85.60	0.24	4.08	0.032	129	2390	1.20	6	165.20	2.09	1.450	0.784	0.659	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	112.59	0.27	4.08	0.032	129	2390	1.20	6	165.50	1.97	1.370	0.741	0.623	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	112.27	0.27	4.08	0.032	129	2390	1.20	6	168.40	1.74	1.480	0.800	0.673	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	112.48	0.27	4.08	0.032	129	2390	1.20	6	163.10	1.87	1.470	0.795	0.668	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	121.09	0.26	4.08	0.032	129	2390	1.20	6	167.10	1.77	1.140	0.616	0.518	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	121.20	0.26	4.08	0.032	129	2390	1.20	6	172.10	1.76	1.390	0.751	0.632	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	121.15	0.26	4.08	0.032	129	2390	1.20	6	168.40	1.78	1.330	0.719	0.605	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	113.72	0.26	4.08	0.032	129	2390	1.20	6	186.50	2.04	1.500	0.811	0.682	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	113.80	0.26	4.08	0.032	129	2390	1.20	6	170.70	1.75	1.190	0.643	0.541	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	113.69	0.26	4.08	0.032	129	2390	1.20	6	178.50	1.94	1.450	0.784	0.659	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	102.00	—	2.54	0.021	120	2900	0.80	4	118.70	1.29	1.290	0.534	0.586	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	100.00	—	2.54	0.021	120	2900	0.80	4	122.30	1.45	1.180	0.488	0.536	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	106.00	—	3.82	0.032	120	2900	1.20	6	153.20	1.70	1.070	0.443	0.486	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	106.00	—	3.82	0.032	120	2900	1.20	6	154.70	1.70	1.100	0.455	0.500	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	100	300	78.50	0.45	1.35	0.011	118	2060	0.29	4	118.30	1.08	-	-	-	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	100	300	78.50	0.45	2.72	0.023	118	2060	0.57	4	167.10	1.42	-	-	-	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	100	300	78.50	0.45	4.08	0.035	118	2060	0.86	3	185.80	1.61	-	-	-	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	100	300	101.20	0.46	1.35	0.011	118	2060	0.29	1	123.30	0.63	-	-	-	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	100	300	101.20	0.46	2.72	0.023	118	2060	0.57	2	154.00	1.02	-	-	-	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	100	300	101.20	0.46	4.08	0.035	118	2060	0.86	3	204.50	1.44	-	-	-	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	85.70	0.24	4.08	0.032	129	2390	1.20	6	166.20	2.02	1.500	0.833	0.682	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	85.70	0.24	4.08	0.032	129	2390	1.20	6	168.00	2.18	1.480	0.822	0.673	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.5	305	85.70	0.24	4.08	0.032	129	2390	1.20	6	165.20	2.09	1.450	0.806	0.659	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	85.60	0.26	1.84	0.004	436	3314	0.16	1	97.10	0.42	0.303	-	0.399	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	85.60	0.26	1.84	0.004	436	3314	0.16	1	99.70	0.54	0.417	-	0.549	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	85.60	0.26	3.79	0.009	436	3314	0.33	2	117.70	0.71	0.436	-	0.574	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	85.60	0.26	3.79	0.009	436	3314	0.33	2	117.50	0.55	0.411	-	0.541	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	85.60	0.26	7.49	0.017	436	3314	0.65	4	161.60	1.02	0.383	-	0.504	LSG	ADM

Table 3. Test database of tube-encased concrete specimens.

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	***D* (mm)**	***H* (mm)**	**f'_{co} (MPa)**	**ε_{co} (%)**	**$\rho_f E_f$ (GPa)**	**ρ_f**	**E_f (GPa)**	**f_f (MPa)**	**t_f (mm)**	***Layers* (num)**	**f'_{cc} (MPa)**	**ε_{cu} (%)**	**ε_{h_rup} (%)**	**k_{ε_FRP}**	**k_{ε_f}**	**Lateral Strain**	**Axial Strain**
Harries and Carey [123]	E-glass	152	305	31.80	0.28	0.39	0.081	4.90	75	3.00	1	33.60	-	1.29	0.843	0.863	LSG	ADM
Harries and Carey [123]	E-glass	152	305	31.80	0.28	1.23	0.251	4.90	75	9.00	3	48.40	-	1.13	0.738	0.756	LSG	ADF
Hong and Kim [150]	Carbon	300	600	17.50	-	3.68	0.027	137.00	2058	2.00	2	75.60	2.88	-	-	-	LSG	ASG
Hong and Kim [150]	Carbon	300	600	17.50	-	5.53	0.040	137.00	2058	3.00	3	80.20	2.23	-	-	-	LSG	ASG
Karantzikis et al. [28]	Carbon	200	350	12.10	0.22	0.55	0.002	230.00	3500	0.12	1	21.54	1.16	-	-	-	N/A	ADM
Li et al. [151]	E-glass	150	300	47.50	0.40	0.59	0.008	73.00	1800	0.30	1	50.90	0.90	1.50	-	0.608	LSG	ASG
Li et al. [151]	E-glass	150	300	47.50	0.40	0.59	0.008	73.00	1800	0.30	1	85.70	2.10	2.40	-	0.973	LSG	ASG
Lim and Ozbakkaloglu [152]	Carbon	152.5	305	29.60	-	1.02	0.004	236.00	4152	0.17	1	57.30	1.84	1.52	-	0.981	LSG	ASG
Lim and Ozbakkaloglu [152]	Carbon	152.5	305	29.60	-	1.02	0.004	236.00	4152	0.17	1	60.40	2.03	1.52	-	0.981	LSG	ASG
Lim and Ozbakkaloglu [152]	Carbon	152.5	305	29.60	-	1.02	0.004	236.00	4152	0.17	1	61.20	2.23	1.50	-	0.968	LSG	ASG
Lim and Ozbakkaloglu [152]	Carbon	152.5	305	49.60	-	2.05	0.009	236.00	4152	0.33	2	98.00	2.48	1.22	-	0.787	LSG	ASG
Lim and Ozbakkaloglu [152]	Carbon	152.5	305	49.60	-	2.05	0.009	236.00	4152	0.33	2	95.30	2.17	1.33	-	0.858	LSG	ASG
Lim and Ozbakkaloglu [152]	Carbon	152.5	305	49.60	-	2.05	0.009	236.00	4152	0.33	2	100.30	2.07	1.36	-	0.877	LSG	ASG
Lim and Ozbakkaloglu [152]	Glass	152.5	305	29.60	-	0.50	0.005	95.30	3055	0.20	1	50.80	1.82	2.00	0.623	0.571	LSG	ASG
Lim and Ozbakkaloglu [152]	Glass	152.5	305	29.60	-	0.50	0.005	95.30	3055	0.20	1	46.60	1.51	1.89	0.589	0.540	LSG	ASG
Lim and Ozbakkaloglu [152]	Glass	152.5	305	29.60	-	0.50	0.005	95.30	3055	0.20	1	49.40	2.02	2.00	0.623	0.571	LSG	ASG
Lim and Ozbakkaloglu [152]	Glass	152.5	305	49.60	-	1.00	0.011	95.30	3055	0.40	2	78.30	1.82	1.59	0.495	0.454	LSG	ASG
Lim and Ozbakkaloglu [152]	Glass	152.5	305	49.60	-	1.00	0.011	95.30	3055	0.40	2	75.60	1.85	1.69	0.526	0.483	LSG	ASG
Lim and Ozbakkaloglu [152]	Glass	152.5	305	49.60	-	1.00	0.011	95.30	3055	0.40	2	71.40	1.42	1.23	0.383	0.351	LSG	ASG
Lim and Ozbakkaloglu [152]	Aramid	152.5	305	29.60	-	0.67	0.005	128.50	2390	0.20	1	52.50	2.12	2.13	0.968	0.852	LSG	ASG
Lim and Ozbakkaloglu [152]	Aramid	152.5	305	29.60	-	0.67	0.005	128.50	2390	0.20	1	50.30	1.95	1.88	0.855	0.752	LSG	ASG
Lim and Ozbakkaloglu [152]	Aramid	152.5	305	29.60	-	0.67	0.005	128.50	2390	0.20	1	50.50	2.01	1.84	0.836	0.736	LSG	ASG
Lim and Ozbakkaloglu [152]	Aramid	152.5	305	49.60	-	1.35	0.011	128.50	2390	0.40	2	83.10	2.60	1.80	0.818	0.720	LSG	ASG
Lim and Ozbakkaloglu [152]	Aramid	152.5	305	49.60	-	1.35	0.011	128.50	2390	0.40	2	87.20	2.32	1.80	0.818	0.720	LSG	ASG
Lim and Ozbakkaloglu [152]	Aramid	152.5	305	49.60	-	1.35	0.011	128.50	2390	0.40	2	84.00	2.75	1.77	0.805	0.708	LSG	ASG
Mastrapa [128]	S-glass	152.5	305	37.20	-	2.10	0.109	19.19	586	4.06	6	112.00	-	-	-	-	N/A	N/A
Mastrapa [128]	S-glass	152.5	305	37.20	-	2.10	0.109	19.19	586	4.06	6	110.00	-	-	-	-	N/A	N/A
Mastrapa [128]	S-glass	152.5	305	29.80	-	0.31	0.016	19.19	565	0.61	1	26.68	1.50	1.10	0.374	0.341	N/A	N/A
Mastrapa [128]	S-glass	152.5	305	31.20	-	0.94	0.049	19.19	565	1.84	3	63.09	3.12	2.25	0.764	0.698	N/A	N/A
Mastrapa [128]	S-glass	152.5	305	31.20	-	0.94	0.049	19.19	565	1.84	3	65.43	3.11	2.22	0.754	0.689	N/A	N/A
Mastrapa [128]	S-glass	152.5	305	31.20	-	1.58	0.082	19.19	565	3.07	5	91.91	4.27	1.97	0.669	0.611	N/A	N/A
Mastrapa [128]	S-glass	152.5	305	31.20	-	1.58	0.082	19.19	565	3.07	5	89.01	5.03	1.75	0.594	0.543	N/A	N/A
Matthys et al. [75]	Carbon	150	300	34.90	0.21	0.62	0.003	200.00	2600	0.12	1	42.20	0.72	1.08	0.831	0.665	LSG	ASG
Matthys et al. [75]	Carbon	150	300	34.90	0.21	2.64	0.006	420.00	1100	0.24	2	40.70	0.36	0.18	0.687	0.435	LSG	ASG
Mirmiran et al. [129]	Glass	152.5	305	29.80	-	0.40	0.007	55.85	1800	0.28	1	33.65	1.00	-	-	-	LSG	ADF
Mirmiran et al. [129]	Glass	152.5	305	29.80	-	0.40	0.007	55.85	1800	0.28	1	33.16	2.30	-	-	-	LSG	ADF
Mirmiran et al. [129]	Glass	152.5	305	29.80	-	0.40	0.007	55.85	1800	0.28	1	33.23	2.00	-	-	-	LSG	ADF
Mirmiran et al. [129]	Glass	152.5	305	29.80	-	1.22	0.022	55.85	1800	0.83	3	63.02	2.70	-	-	-	LSG	ADF
Mirmiran et al. [129]	Glass	152.5	305	29.80	-	1.22	0.022	55.85	1800	0.83	3	65.16	3.00	-	-	-	LSG	ADF
Mirmiran et al. [129]	Glass	152.5	305	29.80	-	1.22	0.022	55.85	1800	0.83	3	65.23	2.80	-	-	-	LSG	ADF
Mirmiran et al. [129]	Glass	152.5	305	29.80	-	2.03	0.036	55.85	1800	1.38	5	93.70	4.30	-	-	-	LSG	ADF
Mirmiran et al. [129]	Glass	152.5	305	29.80	-	2.03	0.036	55.85	1800	1.38	5	92.26	3.90	-	-	-	LSG	ADF
Mirmiran et al. [129]	Glass	152.5	305	29.80	-	1.22	0.022	55.85	1800	0.83	3	96.46	4.40	-	-	-	LSG	ADF
Mirmiran et al. [129]	Glass	152.5	305	31.20	-	1.22	0.022	55.85	1800	0.83	3	67.50	3.00	-	-	-	LSG	ADF
Mirmiran et al. [129]	Glass	152.5	305	31.20	-	2.03	0.036	55.85	1800	1.38	5	64.68	3.10	-	-	-	LSG	ADF

Table 3. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Mirmiran et al. [129]	Glass	152.5	305	31.20	-	2.03	0.036	55.85	1800	1.38	5	91.01	5.30	-	-	-	LSG	ADF
Mirmiran et al. [129]	Glass	152.5	305	31.20	-	0.74	0.003	240.00	3800	0.12	1	96.87	6.30	-	-	-	LSG	ADF
Ozbakkaloglu and Vincent [153]	Carbon	74	152	43.00	-	1.52	0.006	240.00	3800	0.12	1	67.40	1.35	1.07	-	0.676	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	74	152	43.00	-	1.52	0.006	240.00	3800	0.12	1	71.00	1.44	1.32	-	0.834	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	74	152	43.00	-	1.52	0.006	240.00	3800	0.12	1	61.10	0.92	0.91	-	0.575	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	74	152	47.80	-	1.52	0.006	240.00	3800	0.12	1	60.90	0.84	0.83	-	0.524	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	74	152	55.00	-	3.05	0.013	240.00	3800	0.23	2	56.50	0.80	0.72	-	0.455	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	74	152	55.00	-	3.05	0.013	240.00	3800	0.23	2	96.00	1.43	1.13	-	0.714	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	74	152	50.30	-	3.05	0.013	240.00	3800	0.23	2	98.10	1.71	0.95	-	0.600	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	74	152	52.00	0.25	1.52	0.006	240.00	3800	0.12	1	105.70	2.41	1.07	-	0.675	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	152	305	37.30	-	0.74	0.003	240.00	3800	0.12	1	42.00	0.79	1.20	-	0.758	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	152	305	34.60	-	1.48	0.006	240.00	3800	0.23	2	41.60	0.66	0.77	-	0.486	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	152	305	35.50	-	1.48	0.006	240.00	3800	0.23	2	59.10	1.43	1.32	-	0.834	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	152	305	36.30	-	1.48	0.006	240.00	3800	0.23	2	60.90	1.53	1.36	-	0.859	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	152	305	37.30	-	1.48	0.006	240.00	3800	0.23	2	61.70	1.45	1.23	-	0.777	LSG	ASG
Ozbakkaloglu and Vincent [153]	Carbon	302	600	36.30	-	1.49	0.006	240.00	3800	0.47	4	38.60	0.80	1.08	-	0.682	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	302	600	36.30	-	0.32	0.003	120.00	2900	0.20	2	57.00	1.52	1.17	-	0.739	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100	200	37.00	-	0.96	0.008	120.00	2900	0.20	2	70.60	2.06	2.22	-	0.888	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100	200	35.50	-	0.96	0.008	120.00	2900	0.20	2	65.50	1.75	2.08	-	0.832	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100	200	34.00	-	1.19	0.012	99.00	2930	0.30	1	62.80	1.88	2.25	-	0.900	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100	200	37.20	-	1.19	0.012	99.00	2930	0.30	1	89.10	3.10	2.11	-	0.713	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100	200	37.20	-	1.19	0.012	99.00	2930	0.30	1	91.90	3.31	2.39	-	0.808	LSG	ASG
Ozbakkaloglu and Vincent [153]	HM_Carbon	100	200	35.40	-	4.87	0.008	640.00	2650	0.19	2	86.70	3.04	2.21	-	0.747	LSG	ASG
Ozbakkaloglu and Vincent [153]	HM_Carbon	152	305	36.30	-	3.20	0.005	640.00	2650	0.19	2	46.40	0.28	0.12	-	0.290	LSG	ASG
Ozbakkaloglu and Vincent [153]	HM_Carbon	152	305	36.30	-	3.20	0.005	640.00	2650	0.19	2	46.00	0.30	0.11	-	0.266	LSG	ASG
Ozbakkaloglu and Vincent [153]	HM_Carbon	152	305	36.30	-	3.20	0.005	640.00	2650	0.19	2	43.30	0.25	0.18	-	0.435	LSG	ASG
Park et al. [154]	Glass	150	300	32.00	-	1.06	0.027	39.59	321	1.00	1	54.20	1.50	-	-	-	N/A	ASG
Park et al. [154]	Glass	150	300	32.00	-	1.06	0.027	39.59	321	1.00	1	55.30	-	-	-	-	N/A	ASG
Park et al. [154]	Glass	150	300	32.00	-	1.06	0.027	39.59	321	1.00	1	56.70	1.70	-	-	-	N/A	ASG
Park et al. [154]	Glass	150	300	54.00	-	4.58	0.082	56.12	530	3.00	3	95.50	-	-	-	-	N/A	ASG
Park et al. [154]	Glass	150	300	54.00	-	4.58	0.082	56.12	530	3.00	3	114.70	2.36	-	-	-	N/A	ASG
Park et al. [154]	Glass	150	300	54.00	-	4.58	0.082	56.12	530	3.00	3	111.70	-	-	-	-	N/A	ASG
Park et al. [154]	Glass	150	300	54.00	-	7.85	0.138	56.99	607	5.00	5	206.40	3.88	-	-	-	N/A	ASG
Park et al. [154]	Glass	150	300	54.00	-	7.85	0.138	56.99	607	5.00	5	198.90	-	-	-	-	N/A	ASG
Park et al. [154]	Glass	150	300	54.00	-	7.85	0.138	56.99	607	5.00	5	189.10	-	-	-	-	N/A	ASG
Park et al. [154]	Glass	150	450	54.00	-	4.58	0.082	56.12	530	3.00	3	115.30	3.14	-	-	-	N/A	ASG
Park et al. [154]	Glass	150	450	54.00	-	4.58	0.082	56.12	530	3.00	3	113.40	3.42	-	-	-	N/A	ASG
Park et al. [154]	Glass	150	450	54.00	-	4.58	0.082	56.12	530	3.00	3	108.50	3.64	-	-	-	N/A	ASG
Saafi et al. [155]	Glass	152	435	35.00	0.25	0.68	0.021	32.00	450	0.80	1	52.80	1.90	-	-	-	LSG	ASG
Saafi et al. [155]	Glass	152	435	35.00	0.25	1.45	0.043	34.00	505	1.60	2	66.00	2.47	-	-	-	LSG	ASG
Saafi et al. [155]	Glass	152	435	35.00	0.25	2.31	0.064	36.00	560	2.40	3	83.00	3.00	-	-	-	LSG	ASG
Saafi et al. [155]	Carbon	152	435	35.00	0.25	1.06	0.003	367.00	3300	0.11	1	55.00	1.00	-	-	-	LSG	ASG
Saafi et al. [155]	Carbon	152	435	35.00	0.25	2.36	0.006	390.00	3550	0.23	2	68.00	1.60	-	-	-	LSG	ASG
Saafi et al. [155]	Carbon	152	435	35.00	0.25	6.03	0.015	415.00	3700	0.55	5	97.00	2.20	-	-	-	LSG	ASG
Vincent and Ozbakkaloglu [137]	Aramid	152	305	49.40	-	1.90	0.016	120.00	2900	0.60	2	104.60	3.15	2.19	-	0.901	LSG	ASG

Table 3. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	***D* (mm)**	***H* (mm)**	**f'_{co} (MPa)**	**ε_{co} (%)**	**$\rho_f E_f$ (GPa)**	**ρ_f**	**E_f (GPa)**	**f_f (MPa)**	**t_f (mm)**	***Layers* (num)**	**f'_{cc} (MPa)**	**ε_{cu} (%)**	**ε_{h_rup} (%)**	**k_{ε_FRP}**	**k_{ε_f}**	**Lateral Strain**	**Axial Strain**
Vincent and Ozbakkaloglu [137]	Aramid	152	305	49.40	-	1.90	0.016	120.00	2900	0.60	2	107.90	3.55	2.42	-	0.996	LSG	ASG
Vincent and Ozbakkaloglu [137]	Aramid	152	305	49.40	-	1.90	0.016	120.00	2900	0.60	2	106.30	3.47	2.38	-	0.979	LSG	ASG
Vincent and Ozbakkaloglu [137]	Aramid	152	305	49.40	-	1.90	0.016	120.00	2900	0.60	2	109.90	3.01	2.11	-	0.868	LSG	ASG
Vincent and Ozbakkaloglu [137]	Aramid	152	305	49.40	-	1.90	0.016	120.00	2900	0.60	2	109.90	3.18	2.33	-	0.959	LSG	ASG
Vincent and Ozbakkaloglu [137]	Aramid	152	305	49.40	-	1.90	0.016	120.00	2900	0.60	2	110.70	2.98	2.24	-	0.922	LSG	ASG
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	96.40	2.31	1.61	-	0.847	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	94.00	2.22	1.55	-	0.816	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	92.10	2.14	1.35	-	0.711	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	103.60	2.48	1.60	-	0.842	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	95.40	2.25	1.60	-	0.842	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	96.10	2.19	1.69	-	0.889	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	96.80	-	-	-	-	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	100.60	2.20	1.57	-	0.826	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	96.60	2.12	1.69	-	0.889	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	106.40	2.14	-	-	-	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	105.20	-	-	-	-	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	102.30	2.36	1.56	-	0.821	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	95.40	2.19	1.61	-	0.847	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	96.60	2.23	1.49	-	0.784	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	96.20	2.14	1.58	-	0.832	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	96.70	2.17	1.53	-	0.805	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	97.50	2.19	1.46	-	0.768	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	93.80	1.97	1.43	-	0.753	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	99.20	2.08	1.62	-	0.853	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	98.90	1.97	1.58	-	0.832	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152	305	52.00	0.25	2.02	0.009	230.00	4370	0.33	3	99.50	2.12	1.49	-	0.784	LSG	ADM
Lim et al. [127]	Glass	152.5	305	34.00	0.22	1.00	0.011	95.30	3055	0.40	2	78.10	3.39	2.45	-	0.764	LSG	ADM
Lim et al. [127]	Glass	152.5	305	34.00	0.22	1.00	0.011	95.30	3055	0.40	2	76.30	3.63	2.48	-	0.774	LSG	ADM
Lim et al. [127]	Glass	152.5	305	34.00	0.22	1.00	0.011	95.30	3055	0.40	2	75.10	3.23	2.49	-	0.777	LSG	ADM
Vincent et al. [156]	Aramid	152	305	44.80	0.27	1.36	0.011	128.50	2390	0.40	2	78.30	2.15	-	-	-	N/A	ASG
Vincent et al. [156]	Aramid	152	305	44.80	0.23	1.36	0.011	128.50	2390	0.40	2	73.40	1.78	1.79	-	0.962	N/A	ASG
Vincent et al. [156]	Aramid	152	305	44.80	0.23	1.36	0.011	128.50	2390	0.40	2	74.50	1.77	-	-	-	N/A	ASG
Lim et al. [152]	Aramid	152	305	29.60	0.20	0.68	0.005	128.50	2390	0.20	1	52.50	2.12	2.29	-	0.881	LSG	ASG
Lim et al. [152]	Aramid	152	305	29.60	0.20	0.68	0.005	128.50	2390	0.20	1	50.30	1.95	2.34	-	0.900	LSG	ASG
Lim et al. [152]	Aramid	152	305	29.60	0.20	0.68	0.005	128.50	2390	0.20	1	50.50	2.01	2.41	-	0.927	LSG	ASG
Lim et al. [152]	Carbon	152	305	29.60	0.20	1.03	0.004	236.00	4152	0.17	1	57.30	1.84	1.80	-	0.947	LSG	ASG
Lim et al. [152]	Carbon	152	305	29.60	0.20	1.03	0.004	236.00	4152	0.17	1	60.40	2.03	1.84	-	0.968	LSG	ASG
Lim et al. [152]	Carbon	152	305	29.60	0.20	1.03	0.004	236.00	4152	0.17	1	61.20	2.23	1.87	-	0.984	LSG	ASG
Lim et al. [152]	Glass	152	305	29.60	0.20	0.50	0.005	95.30	3055	0.20	1	50.80	1.82	2.54	-	0.726	LSG	ASG
Lim et al. [152]	Glass	152	305	29.60	0.20	0.50	0.005	95.30	3055	0.20	1	46.60	1.51	2.18	-	0.623	LSG	ASG
Lim et al. [152]	Glass	152	305	29.60	0.20	0.50	0.005	95.30	3055	0.20	1	49.40	2.02	2.60	-	0.743	LSG	ASG
Lim et al. [152]	Aramid	152	305	49.60	0.20	1.36	0.011	128.50	2390	0.40	2	83.10	2.60	1.97	-	0.758	LSG	ASG
Lim et al. [152]	Aramid	152	305	49.60	0.20	1.36	0.011	128.50	2390	0.40	2	87.20	2.32	2.11	-	0.812	LSG	ASG
Lim et al. [152]	Aramid	152	305	49.60	0.20	1.36	0.011	128.50	2390	0.40	2	84.00	2.75	2.05	-	0.788	LSG	ASG
Lim et al. [152]	Carbon	152	305	49.60	0.20	2.05	0.009	236.00	4152	0.33	2	98.00	2.48	1.47	-	0.774	LSG	ASG

Table 3. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Lim et al. [152]	Carbon	152	305	49.60	0.20	2.05	0.009	236.00	4152	0.33	2	95.30	2.17	1.66	-	0.874	LSG	ASG
Lim et al. [152]	Carbon	152	305	49.60	0.20	2.05	0.009	236.00	4152	0.33	2	100.30	2.07	1.54	-	0.811	LSG	ASG
Lim et al. [152]	Glass	152	305	49.60	0.20	1.01	0.011	95.30	3055	0.40	2	78.30	1.82	2.00	-	0.571	LSG	ASG
Lim et al. [152]	Glass	152	305	49.60	0.20	1.01	0.011	95.30	3055	0.40	2	75.60	1.85	1.95	-	0.557	LSG	ASG
Lim et al. [152]	Glass	152	305	49.60	0.20	1.01	0.011	95.30	3055	0.40	2	71.40	1.42	1.45	-	0.414	LSG	ASG
Samaan [157]	Glass	145.03	304.8	20.68	0.20	1.49	0.053	28.40	570	1.88	9	77.57	-	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	20.68	0.20	1.49	0.053	28.40	570	1.88	9	87.98	-	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	46.88	0.20	2.65	0.093	28.40	660	3.30	16	126.86	-	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	46.88	0.20	2.65	0.093	28.40	660	3.30	16	125.00	-	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	46.88	0.20	2.65	0.093	28.40	660	3.30	16	121.55	-	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	20.68	0.20	1.49	0.053	28.40	570	1.88	9	49.64	-	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	20.68	0.20	1.49	0.053	28.40	570	1.88	9	63.16	1.53	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	20.68	0.20	1.49	0.053	28.40	570	1.88	9	61.09	1.49	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	46.88	0.20	2.65	0.093	28.40	660	3.30	16	101.56	2.61	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	46.88	0.20	2.65	0.093	28.40	660	3.30	16	88.60	2.35	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	46.88	0.20	2.65	0.093	28.40	660	3.30	16	102.04	2.68	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	40.68	0.20	4.91	0.173	28.40	700	6.02	28	125.14	3.45	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	40.68	0.20	4.91	0.173	28.40	700	6.02	28	135.96	-	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	40.68	0.20	4.91	0.173	28.40	700	6.02	28	125.97	4.04	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.03	0.20	0.89	0.036	24.64	809	1.30	6	53.64	3.06	1.30	0.586	0.415	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.03	0.20	0.89	0.036	24.64	809	1.30	6	56.47	3.27	1.74	0.784	0.556	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.03	0.20	0.89	0.036	24.64	809	1.30	6	67.15	2.90	1.73	0.778	0.552	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.03	0.20	0.89	0.036	24.64	809	1.30	6	55.30	3.76	1.57	0.709	0.503	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.03	0.20	0.89	0.036	24.64	809	1.30	6	60.26	3.80	1.78	0.801	0.568	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.03	0.20	0.89	0.036	24.64	809	1.30	6	59.09	3.43	1.96	0.882	0.625	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.03	0.20	0.89	0.036	24.64	809	1.30	6	60.81	3.43	1.81	0.815	0.578	LSG	ASG
Samaan [157]	Glass	145.03	304.8	29.65	0.20	1.68	0.059	28.40	962	2.11	10	72.88	4.07	1.43	0.650	0.457	LSG	ASG
Samaan [157]	Glass	145.03	304.8	29.65	0.20	1.68	0.059	28.40	962	2.11	10	65.71	2.94	-	-	-	LSG	ASG
Samaan [157]	Glass	145.03	304.8	29.65	0.20	1.68	0.059	28.40	962	2.11	10	77.98	4.41	1.57	0.714	0.502	LSG	ASG
Samaan [157]	Glass	145.03	304.8	29.65	0.20	1.68	0.059	28.40	962	2.11	10	74.53	4.31	1.56	0.709	0.498	LSG	ASG
Samaan [157]	Glass	145.03	304.8	29.65	0.20	1.68	0.059	28.40	962	2.11	10	93.01	4.28	1.74	0.790	0.556	LSG	ASG
Samaan [157]	Glass	145.03	304.8	29.65	0.20	1.68	0.059	28.40	962	2.11	10	71.71	3.92	1.59	0.723	0.508	LSG	ASG
Samaan [157]	Glass	145.03	304.8	29.65	0.20	1.68	0.059	28.40	962	2.11	10	77.36	3.79	1.45	0.659	0.463	LSG	ASG
Samaan [157]	Glass	145.03	304.8	29.65	0.20	1.68	0.059	28.40	962	2.11	10	77.08	3.77	1.38	0.627	0.441	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.72	0.20	2.40	0.084	28.40	962	3.00	14	85.70	4.35	1.36	0.603	0.433	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.72	0.20	2.40	0.084	28.40	962	3.00	14	86.74	4.69	1.48	0.658	0.473	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.72	0.20	2.40	0.084	28.40	962	3.00	14	86.18	4.60	1.24	0.551	0.396	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.72	0.20	2.40	0.084	28.40	962	3.00	14	114.66	5.33	1.92	0.854	0.614	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.72	0.20	2.40	0.084	28.40	962	3.00	14	87.43	4.14	1.44	0.640	0.460	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.72	0.20	2.40	0.084	28.40	962	3.00	14	86.12	4.22	1.28	0.567	0.407	LSG	ASG
Samaan [157]	Glass	145.03	304.8	31.72	0.20	2.40	0.084	28.40	962	3.00	14	83.98	4.30	1.22	0.542	0.390	LSG	ASG
Fam [158]	Glass	100	200	37.70	0.20	2.92	0.127	23.00	548	3.08	9	81.00	-	-	-	-	LSG	ASG
Fam [158]	Glass	100	200	37.70	0.20	1.11	0.127	8.70	398	3.09	1	50.30	-	-	-	-	LSG	ASG

Table 3. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Lim and Ozbakkalaglu [152]	Carbon	152.5	305.0	74.10	-	3.07	0.013	236.00	4152	0.50	2	141.70	1.49	1.17	-	0.665	LSG	ASG
Lim and Ozbakkalaglu [152]	Carbon	152.5	305.0	74.10	-	3.07	0.013	236.00	4152	0.50	2	146.10	1.47	1.03	-	0.585	LSG	ASG
Lim and Ozbakkalaglu [152]	Carbon	152.5	305.0	74.10	-	3.07	0.013	236.00	4152	0.50	2	147.60	1.71	1.29	-	0.733	LSG	ASG
Lim and Ozbakkalaglu [152]	Carbon	152.5	305.0	98.00	-	4.10	0.017	236.00	4152	0.66	3	173.10	2.16	1.20	-	0.682	LSG	ASG
Lim and Ozbakkalaglu [152]	Carbon	152.5	305.0	98.00	-	4.10	0.017	236.00	4152	0.66	3	180.30	2.03	1.48	-	0.841	LSG	ASG
Lim and Ozbakkalaglu [152]	Carbon	152.5	305.0	98.00	-	4.10	0.017	236.00	4152	0.66	3	174.40	2.20	1.34	-	0.762	LSG	ASG
Lim and Ozbakkalaglu [152]	Glass	152.5	305.0	74.10	-	1.51	0.016	95.30	3055	0.60	3	90.80	0.54	0.43	-	0.134	LSG	ASG
Lim and Ozbakkalaglu [152]	Glass	152.5	305.0	74.10	-	1.51	0.016	95.30	3055	0.60	3	91.80	1.22	0.84	-	0.262	LSG	ASG
Lim and Ozbakkalaglu [152]	Glass	152.5	305.0	74.10	-	1.51	0.016	95.30	3055	0.60	3	93.00	1.21	0.93	-	0.290	LSG	ASG
Lim and Ozbakkalaglu [152]	Glass	152.5	305.0	98.00	-	2.01	0.021	95.30	3055	0.80	4	135.20	2.29	1.64	-	0.512	LSG	ASG
Lim and Ozbakkalaglu [152]	Glass	152.5	305.0	98.00	-	2.01	0.021	95.30	3055	0.80	4	140.30	2.80	1.74	-	0.543	LSG	ASG
Lim and Ozbakkalaglu [152]	Glass	152.5	305.0	98.00	-	2.01	0.021	95.30	3055	0.80	4	133.90	2.40	1.54	-	0.480	LSG	ASG
Lim and Ozbakkalaglu [152]	Aramid	152.5	305.0	74.10	-	2.03	0.016	128.50	2390	0.60	3	123.50	2.28	1.69	-	0.909	LSG	ASG
Lim and Ozbakkalaglu [152]	Aramid	152.5	305.0	74.10	-	2.03	0.016	128.50	2390	0.60	3	126.40	2.51	1.80	-	0.968	LSG	ASG
Lim and Ozbakkalaglu [152]	Aramid	152.5	305.0	74.10	-	2.03	0.016	128.50	2390	0.60	3	108.80	2.09	1.35	-	0.726	LSG	ASG
Lim and Ozbakkalaglu [152]	Aramid	152.5	305.0	98.00	-	2.71	0.021	128.50	2390	0.80	4	125.80	2.06	1.19	-	0.640	LSG	ASG
Lim and Ozbakkalaglu [152]	Aramid	152.5	305.0	98.00	-	2.71	0.021	128.50	2390	0.80	4	130.90	1.73	1.17	-	0.629	LSG	ASG
Lim and Ozbakkalaglu [152]	Aramid	152.5	305.0	98.00	-	2.71	0.021	128.50	2390	0.80	4	132.80	2.39	1.47	-	0.790	LSG	ASG
Lim and Ozbakkalaglu [147]	Glass	152.5	305.0	84.84	0.28	3.02	0.032	95.30	3055	1.20	3	184.10	2.91	2.24	-	0.699	LSG	ADM
Lim and Ozbakkalaglu [147]	Glass	152.5	305.0	84.65	0.28	3.02	0.032	95.30	3055	1.20	3	182.00	2.71	1.99	-	0.621	LSG	ADM
Lim and Ozbakkalaglu [147]	Glass	152.5	305.0	84.55	0.28	3.02	0.032	95.30	3055	1.20	3	178.40	2.90	2.18	-	0.680	LSG	ADM
Lim and Ozbakkalaglu [147]	Glass	152.5	305.0	84.64	0.28	3.02	0.032	95.30	3055	1.20	3	187.90	2.83	1.96	-	0.611	LSG	ADM
Lim and Ozbakkalaglu [147]	Glass	152.5	305.0	84.69	0.28	3.02	0.032	95.30	3055	1.20	3	180.40	2.78	2.46	-	0.767	LSG	ADM
Lim and Ozbakkalaglu [147]	Glass	152.5	305.0	84.76	0.28	3.02	0.032	95.30	3055	1.20	3	176.30	2.65	1.94	-	0.605	LSG	ADM
Lim and Ozbakkalaglu [147]	Glass	152.5	305.0	84.57	0.28	3.02	0.032	95.30	3055	1.20	3	188.60	3.61	2.38	-	0.742	LSG	ADM
Lim and Ozbakkalaglu [147]	Glass	152.5	305.0	84.51	0.28	3.02	0.032	95.30	3055	1.20	3	181.70	3.26	2.35	-	0.733	LSG	ADM
Lim and Ozbakkalaglu [147]	Glass	152.5	305.0	84.69	0.28	3.02	0.032	95.30	3055	1.20	3	164.30	2.74	1.99	-	0.621	LSG	ADM
Lim and Ozbakkalaglu [147]	Glass	152.5	305.0	57.40	0.26	3.02	0.032	95.30	3055	1.20	3	125.70	3.54	2.48	-	0.774	LSG	ADM
Lim and Ozbakkalaglu [147]	Glass	152.5	305.0	57.30	0.26	3.02	0.032	95.30	3055	1.20	3	127.20	3.61	2.67	-	0.833	LSG	ADM
Lim and Ozbakkalaglu [147]	Glass	152.5	305.0	57.29	0.26	3.02	0.032	95.30	3055	1.20	3	131.20	3.80	2.50	-	0.780	LSG	ADM
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	85.90	-	1.93	0.016	120.00	2900	0.40	2	121.30	1.65	1.76	-	0.728	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	82.40	-	1.93	0.016	120.00	2900	0.40	2	107.30	1.58	1.84	-	0.761	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	82.40	-	1.93	0.016	120.00	2900	0.40	2	112.30	1.65	1.92	-	0.794	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	85.90	-	2.90	0.024	120.00	2900	0.60	3	148.20	1.92	1.62	-	0.670	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	85.90	-	2.90	0.024	120.00	2900	0.60	3	154.30	2.23	1.76	-	0.728	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	85.90	-	2.90	0.024	120.00	2900	0.60	3	159.70	2.38	2.17	-	0.898	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	110.10	-	2.90	0.024	120.00	2900	0.60	3	154.80	2.11	1.35	-	0.559	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	110.10	-	2.90	0.024	120.00	2900	0.60	3	150.90	1.71	1.54	-	0.637	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	110.10	-	2.90	0.024	120.00	2900	0.60	3	156.60	1.87	1.78	-	0.737	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	110.10	-	3.87	0.032	120.00	2900	0.80	4	183.80	2.21	1.47	-	0.608	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	110.10	-	3.87	0.032	120.00	2900	0.80	4	190.90	2.47	1.57	-	0.650	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	110.10	-	3.87	0.032	120.00	2900	0.80	4	198.80	-	-	-	-	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	152.0	305.0	79.60	-	1.90	0.016	120.00	2900	0.60	3	105.00	1.67	2.12	-	0.877	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	152.0	305.0	77.20	-	1.90	0.016	120.00	2900	0.60	3	102.00	1.64	1.59	-	0.658	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	152.0	305.0	77.00	-	1.90	0.016	120.00	2900	0.60	3	118.00	2.23	1.79	-	0.741	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	152.0	305.0	104.50	-	3.82	0.032	120.00	2900	1.20	6	164.30	1.98	1.19	-	0.492	LSG	ASG

Table 3. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	Fiber Type	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	Lateral Strain	Axial Strain
Ozbakkaloglu and Vincent [153]	Aramid	152.0	305.0	104.50	-	3.82	0.032	120.00	2900	1.20	6	168.70	2.18	1.53	-	0.633	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	152.0	305.0	104.50	-	3.82	0.032	120.00	2900	1.20	6	178.90	2.05	1.63	-	0.674	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	85.90	-	1.59	0.016	99.00	2930	0.40	2	176.20	2.89	2.36	-	0.797	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	83.00	-	1.59	0.016	99.00	2930	0.40	2	154.90	2.53	1.74	-	0.589	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	85.90	-	1.59	0.016	99.00	2930	0.40	2	176.60	2.89	2.42	-	0.818	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	110.10	-	2.39	0.024	99.00	2930	0.60	3	232.40	3.22	2.01	-	0.679	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	110.10	-	2.39	0.024	99.00	2930	0.60	3	224.10	2.81	2.11	-	0.713	LSG	ASG
Ozbakkaloglu and Vincent [153]	Aramid	100.0	200.0	110.10	-	2.39	0.024	99.00	2930	0.60	3	244.60	3.48	2.26	-	0.764	LSG	ASG
Ozbakkaloglu and Vincent [153]	HM_Carbon	152.0	305.0	59.00	-	3.20	0.005	640.00	2650	0.19	1	70.00	0.50	0.26	-	0.638	LSG	ASG
Ozbakkaloglu and Vincent [153]	HM_Carbon	152.0	305.0	55.60	-	3.20	0.005	640.00	2650	0.19	1	66.60	0.50	0.22	-	0.553	LSG	ASG
Ozbakkaloglu and Vincent [153]	HM_Carbon	152.0	305.0	59.00	-	3.20	0.005	640.00	2650	0.19	1	69.90	0.47	0.26	-	0.638	LSG	ASG
Ozbakkaloglu and Vincent [153]	HM_Carbon	152.0	305.0	59.00	-	6.42	0.010	640.00	2650	0.38	2	70.80	0.47	0.11	-	0.283	LSG	ASG
Ozbakkaloglu and Vincent [153]	HM_Carbon	152.0	305.0	59.00	-	6.42	0.010	640.00	2650	0.38	2	77.30	0.45	0.14	-	0.350	LSG	ASG
Ozbakkaloglu and Vincent [153]	HM_Carbon	152.0	305.0	59.00	-	6.42	0.010	640.00	2650	0.38	2	73.50	0.40	0.10	-	0.250	LSG	ASG
Vincent and Ozbakkaloglu [149]	Carbon	152.0	305.0	84.70	0.28	4.05	0.018	230.00	4370	0.67	6	160.10	1.66	1.23	-	0.647	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.0	305.0	84.70	0.28	4.05	0.018	230.00	4370	0.67	6	172.50	1.80	1.49	-	0.784	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.0	305.0	84.70	0.28	4.05	0.018	230.00	4370	0.67	6	179.60	1.95	1.34	-	0.705	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.0	305.0	84.70	0.28	4.05	0.018	230.00	4370	0.67	6	186.80	2.06	1.03	-	0.542	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.0	305.0	84.70	0.28	4.05	0.018	230.00	4370	0.67	6	192.40	2.00	1.44	-	0.758	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.0	305.0	84.70	0.28	4.05	0.018	230.00	4370	0.67	6	172.00	1.80	1.25	-	0.658	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.0	305.0	84.70	0.28	4.05	0.018	230.00	4370	0.67	6	179.40	1.78	1.06	-	0.558	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.0	305.0	84.70	0.28	4.05	0.018	230.00	4370	0.67	6	181.20	1.81	-	-	-	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.0	305.0	84.70	0.28	4.05	0.018	230.00	4370	0.67	6	188.60	1.97	1.38	-	0.726	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.0	305.0	84.70	0.28	4.05	0.018	230.00	4370	0.67	6	189.20	1.97	-	-	-	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.0	305.0	84.70	0.28	4.05	0.018	230.00	4370	0.67	6	186.20	1.90	-	-	-	LSG	ADM
Vincent and Ozbakkaloglu [149]	Carbon	152.0	305.0	84.70	0.28	4.05	0.018	230.00	4370	0.67	6	192.30	2.13	-	-	-	LSG	ADM
Lim and Ozbakkaloglu [127]	Aramid	152.5	305.0	73.00	0.26	2.71	0.021	128.50	2390	0.80	4	130.10	1.88	1.65	-	0.750	LSG	ADM
Lim and Ozbakkaloglu [127]	Aramid	152.5	305.0	73.00	0.26	2.71	0.021	128.50	2390	0.80	4	130.50	1.69	1.67	-	0.759	LSG	ADM
Lim and Ozbakkaloglu [127]	Aramid	152.5	305.0	73.00	0.26	2.71	0.021	128.50	2390	0.80	4	139.30	2.14	2.02	-	0.918	LSG	ADM
Lim and Ozbakkaloglu [127]	Glass	152.5	305.0	73.00	0.26	2.01	0.021	95.30	3055	0.80	4	136.00	2.69	2.45	-	0.700	LSG	ADM
Lim and Ozbakkaloglu [127]	Glass	152.5	305.0	73.00	0.26	2.01	0.021	95.30	3055	0.80	4	138.70	2.74	2.46	-	0.703	LSG	ADM
Lim and Ozbakkaloglu [127]	Glass	152.5	305.0	73.00	0.26	2.01	0.021	95.30	3055	0.80	4	136.30	2.61	2.23	-	0.637	LSG	ADM
Vincent and Ozbakkaloglu [156]	Aramid	152.0	305.0	83.20	0.28	2.72	0.021	128.50	2390	0.80	4	133.70	1.77	1.49	-	0.677	N/A	ASG
Vincent and Ozbakkaloglu [156]	Aramid	152.0	305.0	83.20	0.27	2.72	0.021	128.50	2390	0.80	4	136.80	1.72	1.53	-	0.695	N/A	ASG
Vincent and Ozbakkaloglu [156]	Aramid	152.0	305.0	83.20	0.30	2.72	0.021	128.50	2390	0.80	4	139.10	1.93	1.47	-	0.668	N/A	ASG
Lim and Ozbakkaloglu [152]	Aramid	152.0	305.0	74.10	0.20	2.04	0.016	128.50	2390	0.60	3	123.50	2.28	1.93	-	0.877	LSG	ASG
Lim and Ozbakkaloglu [152]	Aramid	152.0	305.0	74.10	0.20	2.04	0.016	128.50	2390	0.60	3	126.40	2.51	2.12	-	0.964	LSG	ASG
Lim and Ozbakkaloglu [152]	Aramid	152.0	305.0	74.10	0.20	2.04	0.016	128.50	2390	0.60	3	108.80	2.09	1.86	-	0.845	LSG	ASG
Lim and Ozbakkaloglu [152]	Carbon	152.0	305.0	74.10	0.20	3.08	0.013	236.00	4152	0.50	3	141.70	1.49	1.79	-	0.942	LSG	ASG
Lim and Ozbakkaloglu [152]	Carbon	152.0	305.0	74.10	0.20	3.08	0.013	236.00	4152	0.50	3	146.10	1.47	1.24	-	0.653	LSG	ASG
Lim and Ozbakkaloglu [152]	Carbon	152.0	305.0	74.10	0.20	3.08	0.013	236.00	4152	0.50	3	147.60	1.71	1.72	-	0.905	LSG	ASG
Lim and Ozbakkaloglu [152]	Glass	152.0	305.0	74.10	0.20	1.51	0.016	95.30	3055	0.60	3	90.80	0.54	0.50	-	0.143	LSG	ASG
Lim and Ozbakkaloglu [152]	Glass	152.0	305.0	74.10	0.20	1.51	0.016	95.30	3055	0.60	3	91.80	1.22	1.04	-	0.297	LSG	ASG
Lim and Ozbakkaloglu [152]	Glass	152.0	305.0	74.10	0.20	1.51	0.016	95.30	3055	0.60	3	93.00	1.21	1.07	-	0.306	LSG	ASG
Lim and Ozbakkaloglu [152]	Aramid	152.0	305.0	98.00	0.20	2.72	0.021	128.50	2390	0.80	4	125.80	2.06	1.49	-	0.677	LSG	ASG
Lim and Ozbakkaloglu [152]	Aramid	152.0	305.0	98.00	0.20	2.72	0.021	128.50	2390	0.80	4	130.90	1.73	1.49	-	0.677	LSG	ASG

Table 3. *Cont.*

Paper	Confining Material	Cylinder Dimensions		Concrete Properties		FRP Jacket Properties						Measured Ultimate Conditions			Hoop-Rupture-Strain Factors		Measurement Method	
Author	**Fiber Type**	D (mm)	H (mm)	f'_{co} (MPa)	ε_{co} (%)	$\rho_f E_f$ (GPa)	ρ_f	E_f (GPa)	f_f (MPa)	t_f (mm)	*Layers* (num)	f'_{cc} (MPa)	ε_{cu} (%)	ε_{h_rup} (%)	k_{ε_FRP}	k_{ε_f}	**Lateral Strain**	**Axial Strain**
Lim and Ozbakkaloglu [152]	Aramid	152.0	305.0	98.00	0.20	2.72	0.021	128.50	2390	0.80	4	132.80	2.39	1.84	-	0.836	LSG	ASG
Lim and Ozbakkaloglu [152]	Carbon	152.0	305.0	98.00	0.20	4.12	0.017	236.00	4152	0.66	4	173.10	2.16	1.59	-	0.837	LSG	ASG
Lim and Ozbakkaloglu [152]	Carbon	152.0	305.0	98.00	0.20	4.12	0.017	236.00	4152	0.66	4	180.30	2.03	1.74	-	0.916	LSG	ASG
Lim and Ozbakkaloglu [152]	Carbon	152.0	305.0	98.00	0.20	4.12	0.017	236.00	4152	0.66	4	174.40	2.20	1.74	-	0.916	LSG	ASG
Lim and Ozbakkaloglu [152]	Glass	152.0	305.0	98.00	0.20	2.02	0.021	95.30	3055	0.80	4	135.20	2.29	1.77	-	0.506	LSG	ASG
Lim and Ozbakkaloglu [152]	Glass	152.0	305.0	98.00	0.20	2.02	0.021	95.30	3055	0.80	4	140.30	2.80	1.98	-	0.566	LSG	ASG
Lim and Ozbakkaloglu [152]	Glass	152.0	305.0	98.00	0.20	2.02	0.021	95.30	3055	0.80	4	133.90	2.40	1.84	-	0.526	LSG	ASG
Lim and Ozbakkaloglu [147]	Glass	152.5	305.0	84.70	0.28	3.02	0.032	95.30	3055	1.20	6	184.10	2.91	2.24	-	0.640	LSG	ASG
Lim and Ozbakkaloglu [147]	Glass	152.5	305.0	84.70	0.28	3.02	0.032	95.30	3055	1.20	6	182.00	2.71	1.99	-	0.569	LSG	ASG
Lim and Ozbakkaloglu [147]	Glass	152.5	305.0	84.70	0.28	3.02	0.032	95.30	3055	1.20	6	178.40	2.90	2.18	-	0.623	LSG	ASG
Lim and Ozbakkaloglu [147]	Glass	152.5	305.0	57.30	0.26	2.01	0.021	95.30	3055	0.80	4	125.70	3.54	2.48	-	0.709	LSG	ASG
Lim and Ozbakkaloglu [147]	Glass	152.5	305.0	57.30	0.26	2.01	0.021	95.30	3055	0.80	4	127.20	3.61	2.67	-	0.763	LSG	ASG
Lim and Ozbakkaloglu [147]	Glass	152.5	305.0	57.30	0.26	2.01	0.021	95.30	3055	0.80	4	131.20	3.80	2.50	-	0.714	LSG	ASG
Fam [158]	Glass	168.0	336.0	58.00	0.20	2.07	0.062	33.40	548	2.56	9	97.10	-	-	-	-	LSG	ASG
Fam [158]	Glass	168.0	336.0	58.00	0.20	2.07	0.062	33.40	548	2.56	9	94.50	-	-	-	-	LSG	ASG
Fam [158]	Glass	219.0	438.0	58.00	0.20	1.36	0.041	33.40	193	2.21	9	70.10	-	-	-	-	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	59.00	-	0.74	0.003	240.00	3800	0.12	1	58.80	0.72	0.90	-	0.581	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	59.00	-	0.74	0.003	240.00	3800	0.12	1	60.10	0.56	1.08	-	0.697	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	59.00	-	0.74	0.003	240.00	3800	0.12	1	57.30	0.61	1.03	-	0.665	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	59.00	-	1.48	0.006	240.00	3800	0.23	2	68.40	0.95	1.14	-	0.735	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	59.00	-	1.48	0.006	240.00	3800	0.23	2	65.40	1.05	1.19	-	0.768	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	62.00	-	1.48	0.006	240.00	3800	0.23	2	66.80	0.84	1.03	-	0.665	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	59.00	-	2.22	0.009	240.00	3800	0.35	3	79.20	1.24	1.07	-	0.690	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	65.00	-	2.22	0.009	240.00	3800	0.35	3	78.00	1.30	0.77	-	0.497	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	59.00	-	2.22	0.009	240.00	3800	0.35	3	81.60	1.54	0.92	-	0.594	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	92.00	-	0.74	0.003	240.00	3800	0.12	1	96.70	0.60	0.78	-	0.503	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	85.60	-	0.74	0.003	240.00	3800	0.12	1	91.00	0.45	0.68	-	0.439	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	93.10	-	1.48	0.006	240.00	3800	0.23	2	97.90	0.75	0.92	-	0.594	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	83.10	-	1.48	0.006	240.00	3800	0.23	2	95.60	0.79	0.92	-	0.594	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	80.40	-	1.48	0.006	240.00	3800	0.23	2	89.70	0.46	0.50	-	0.323	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	102.50	-	3.71	0.015	240.00	3800	0.59	5	119.20	1.06	0.87	-	0.561	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	102.50	-	3.71	0.015	240.00	3800	0.59	5	112.80	1.01	0.74	-	0.477	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	59.00	-	2.96	0.012	240.00	3800	0.47	4	78.40	1.14	0.92	-	0.594	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	59.00	-	2.96	0.012	240.00	3800	0.47	4	88.00	1.36	0.98	-	0.632	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	92.70	-	2.22	0.009	240.00	3800	0.35	3	101.30	0.81	0.75	-	0.484	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	94.70	-	2.22	0.009	240.00	3800	0.35	3	103.40	0.89	0.86	-	0.555	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	90.10	-	2.22	0.009	240.00	3800	0.35	3	96.00	0.82	0.84	-	0.542	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	93.00	-	2.96	0.012	240.00	3800	0.47	4	97.90	0.92	0.71	-	0.458	LSG	ASG
Ozbakkaloglu and Akin [136]	CFRP_H	152.0	305.0	100.00	-	2.96	0.012	240.00	3800	0.47	4	107.90	0.96	0.88	-	0.568	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	97.50	-	2.96	0.012	240.00	3800	0.47	4	107.20	1.01	0.97	-	0.626	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	102.50	-	4.45	0.019	240.00	3800	0.70	7	131.10	1.27	0.89	-	0.574	LSG	ASG
Ozbakkaloglu and Akin [136]	CFRP_H	152.0	305.0	94.00	-	4.45	0.019	240.00	3800	0.70	6	124.40	1.16	0.78	-	0.503	LSG	ASG
Vincent and Ozbakkaloglu [100]	CFRP_H	152.0	305.0	93.00	-	4.45	0.019	240.00	3800	0.70	6	112.10	1.09	0.66	-	0.426	LSG	ASG

3. Results and Discussion

3.1. Database-Content Analysis

According to the database analysis, nearly 80% of the 1470 specimens were confined using a wet-layup technique of externally bonded FRP jackets, which is typically used to strengthen existing reinforced-concrete structures. As illustrated in Figure 2, carbon fibers were the most commonly used composite materials for confinement, accounting for 60.48% of the specimens, followed by glass fibers, accounting for 28.37%, and aramid, representing 11.16%. It is therefore obvious that the higher strength and modulus of carbon fibers render them considerately more attractive than glass and aramid fibers.

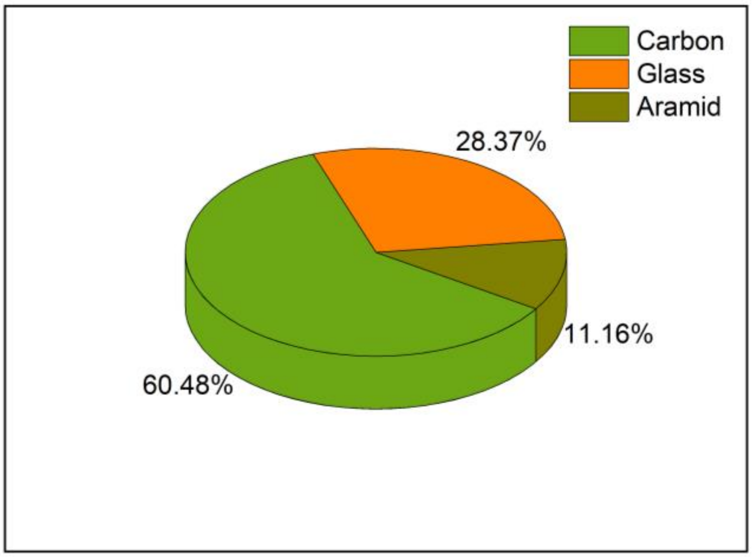

Figure 2. Different FRP materials used for confinement.

The properties of FRPs vary according to the material used, as shown in Table 4. For each of the three unconfined concrete compressive-strength categories, the FRP properties, such as the ultimate axial stress and the modulus of elasticity, are shown. To investigate the variability of the confining materials' properties for each category, both the stress and modulus range and the average values are presented. The high range appears because, in some cases, only the values of the fibers, instead of those of the composite, are provided. Furthermore, the number of FRP layers used for confinement is presented in the last two columns in the Table 4. It is obvious that, typically, two or three fabric layers were used as jackets.

Table 4. Properties of FRP fabrics used as jacketing materials.

Concrete Strength	Fiber Type	f_f (MPa)		E_f (GPa)		Layers	
		Range	Average	Range	Average	Range	Average
Low	CFRP	3430–4410	3789.5	230–235	231.8	1–6	3
Normal	CFRP	174–4900	2990.2	15.7–262	194.2	1–12	2
	GFRP	75–3910	1203.7	2.6–95.3	43.7	1–15	3
	AFRP	230–3732	2033.1	13.6–120	91.8	1–4	2
	HM_UHM_CFRP	1100–4410	3470.8	372.8–640	426	1–5	2
High	CFRP	403–4338	2701.2	34–242	186.6	1–12	3
	GFRP	325–3055	902.9	21–95.3	33.4	1–12	2
	AFRP	2060–2900	2392.1	118–128.5	125	1–6	5
	HM_UHM_CFRP	3314–4410	3953.3	377–436	401.6	1–5	2

As shown in Figure 3 in nearly 50% of the experiments, the mechanical properties, such as the tensile strength, strain, and modulus of elasticity of the FRP, were obtained through the tensile testing of flat composite coupons. Since it is known that confined specimens fail due to FRP rupture when the ultimate strain is reached, it is very important to accurately characterize the mechanical properties of the FRP material used as the jacket [159]. A significant number of studies, up to 35.7% of those analyzed, reported only the values provided by the manufacturer, while 8.2% conducted split-disc tests to obtain the properties. Split-disc tests are known to provide more appropriate measurements for applications such as the confinement of cylindrical specimens. However, approximately 7% of the studies did not state the source of the FRP materials' properties. It is worth noting that the mechanical properties of confining FRP materials have a significant impact on the mechanical properties of confined specimens [17,159]. Additionally, some researchers observed that the methodology used to obtain the mechanical properties of FRP composites influences their mechanical properties. More specifically, it is well documented that the FRP-composite properties, such as tensile strength and elastic modulus, which are manually applied using the wet-layup process, can be quite low compared to the properties reported by the manufacturer [71]. It is critical to limit the uncertainty associated with FRP characteristics since, otherwise, the data may be highly variable, leading to inaccurate analytical formulations. Therefore, the use of experimental data related to FRP properties originating from unspecified sources should be avoided.

When comparing specimen instrumentation (Figure 4), it was evident that in more than half of the conducted tests, strain gauges were used to measure the axial deformation. The use of strain gauges for the measurement of lateral strains was the most common approach, used in 71.7% of the total specimen population. For the axial strains, ADM was used in 23.5% of the specimens, while for 14% of the specimens, the authors did not mention how the strains were measured. It should be noted that in more than 9% of the reported specimens, the strains were measured using LVDTs that ere greater the total lengths of the specimens. These methods typically result in incorrect strain calculations and should be avoided. By contrast, DICT technology provides high-precision measurements that take into consideration the variability of the local strains, but it was used in only 2.8% and 1.5% of the specimens for axial and lateral strain measurements, respectively. The very high cost of the equipment and the recent development of the technology may be explanations for the low usage of DICT. It should be mentioned that measurements with DICT may provide better results than those obtained other types of specimen instrumentation [35,62]. Notably, in 21.4% of the specimens, the researchers failed to mention how the lateral strain was recorded. The data from such studies should be used with caution because they may contain methodological errors.

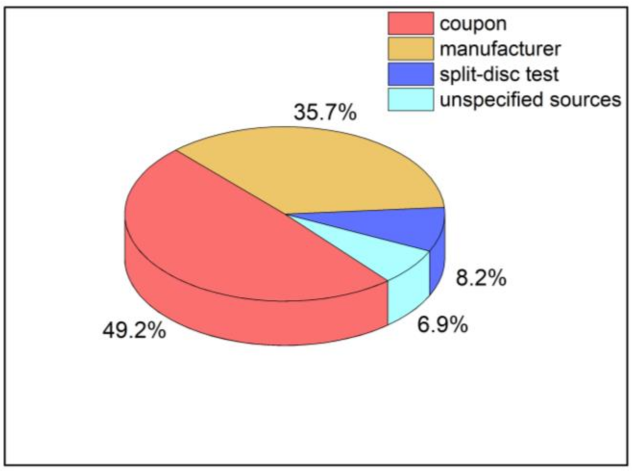

Figure 3. Different methodologies used to obtain FRP properties.

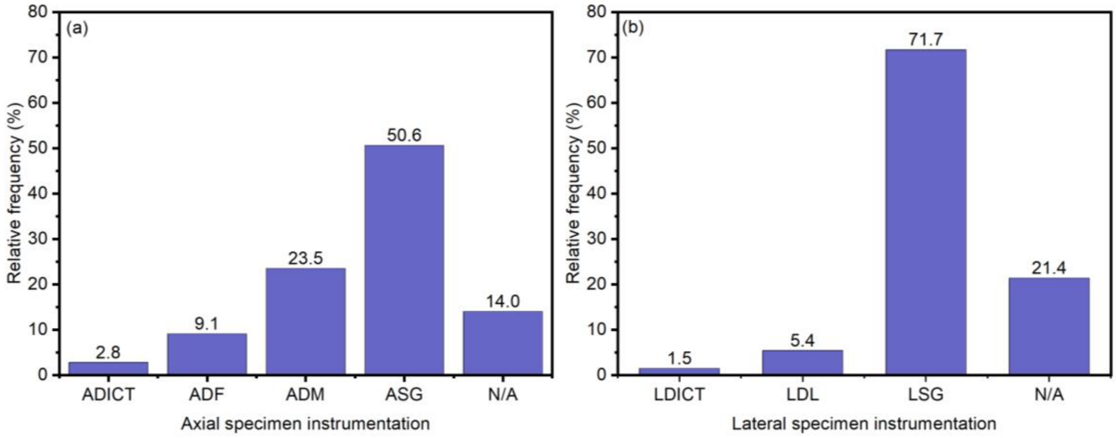

Figure 4. Specimen (**a**) axial and (**b**) lateral instrumentation.

As stated above, the database specimens were divided into two categories based on the unconfined concrete compressive strength, which ranged from 6.20 MPa to 169.70 MPa for most of the FRP-wrapped specimens and from 12.10 MPa to 110.10 MPa for the tube-encased specimens. The frequency-count plots of the unconfined concrete strength (f_{co}) are illustrated in Figures 5 and 6 for the low/normal- and high-strength concrete, respectively. Through these frequency plots, the distributional information for the unconfined compressive strength can be summarized. Each of these figures consists of four plots based on the types of fiber used in the jacket (namely, carbon, glass, aramid, and high-modulus carbon). In particular, the unconfined concrete strength of the FRP-wrapped specimens varied from 6.20 MPa to 55.20 MPa in the category of low and normal concrete strength for the majority of the specimens (Figure 5); carbon fibers were the most commonly used confining materials, followed by glass and aramid.

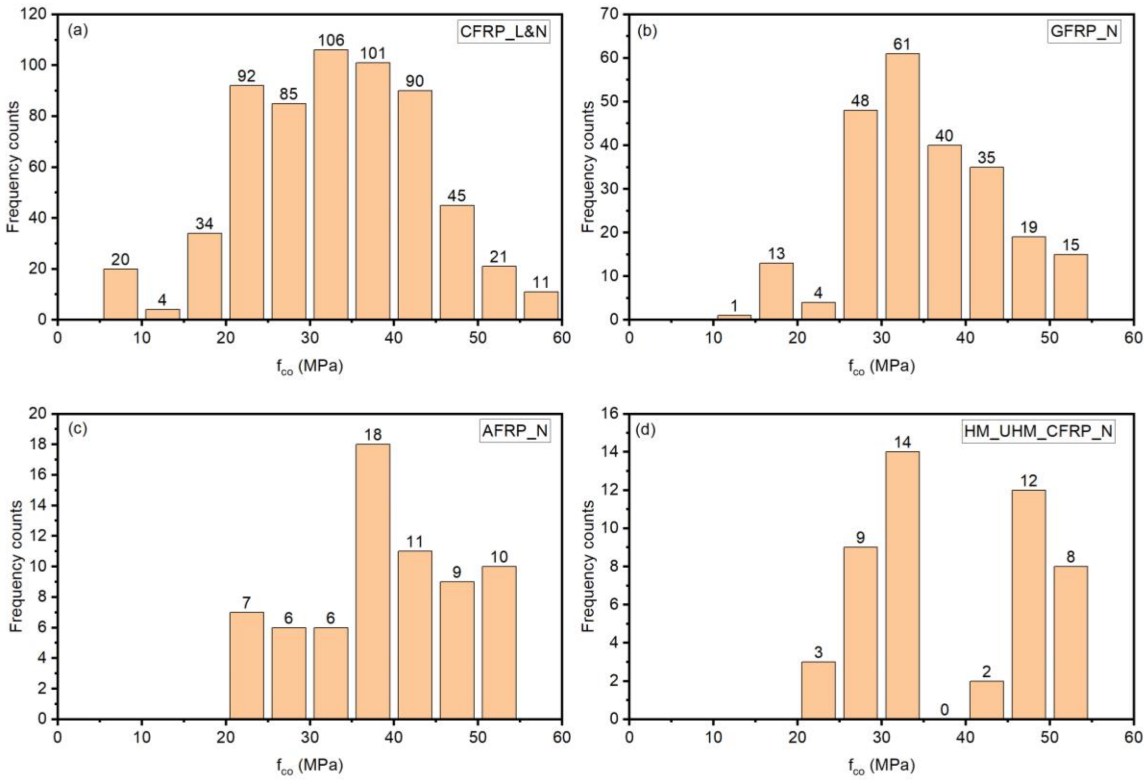

Figure 5. Unconfined concrete strength (f_{co}) of specimens per material, for low- and normal-compressive-strength (**a**) CFRP; (**b**) GFRP; (**c**) AFRP; and (**d**) HM_UHM_CFRP.

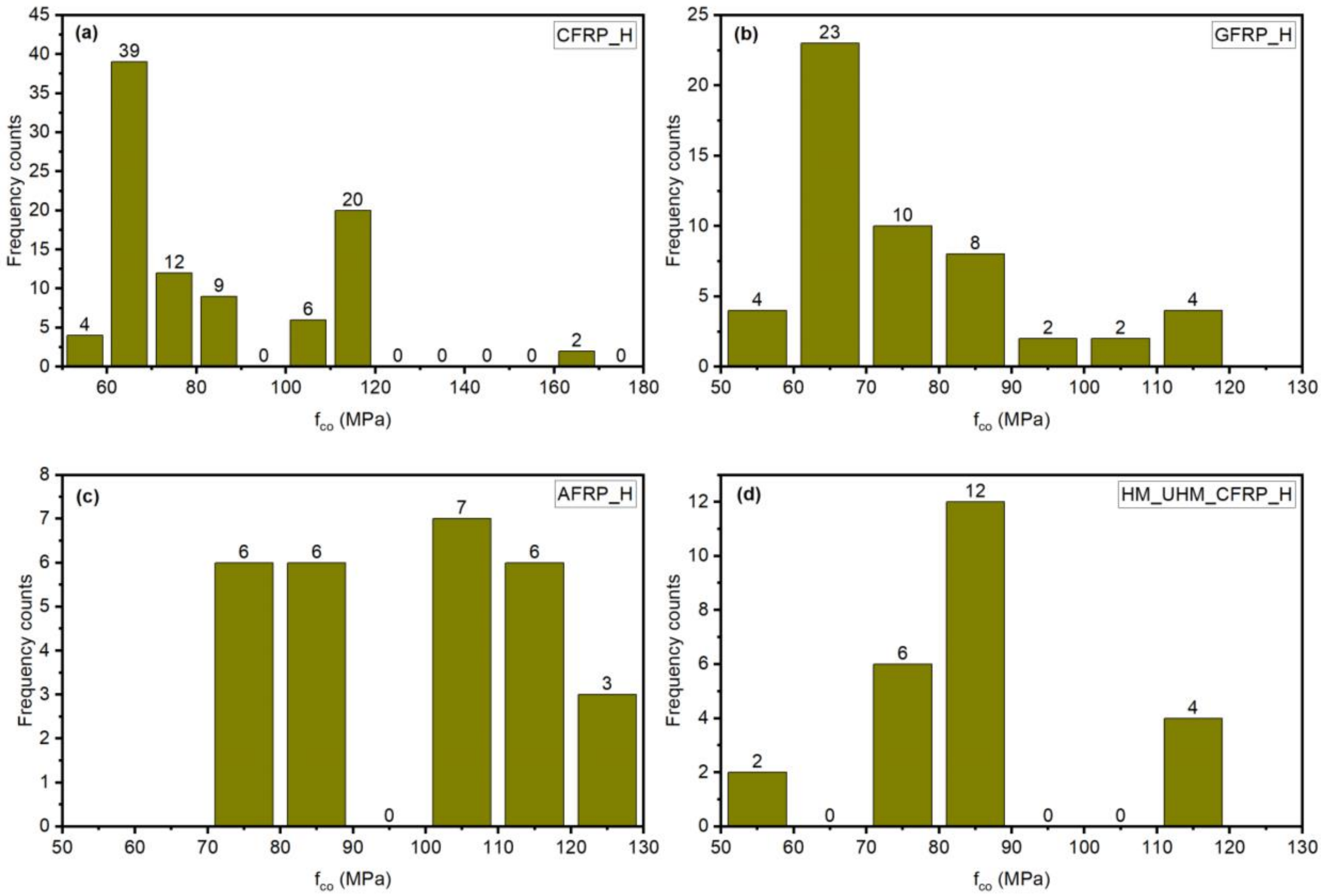

Figure 6. Unconfined concrete strengths (f_{co}) of specimens for high-compressive-strength (**a**) CFRP; (**b**) GFRP; (**c**) AFRP; and (**d**) HM_UHM_CFRP.

The majority of the specimens in the high-concrete-strength category confined with CFRP jackets exhibited a 28-day unconfined compressive strength that varied from 56.70 MPa to 120 MPa (Figure 6a). A similar range was also identified in the other three categories of specimens confined with GFRP, AFRP, and UHM_CFRP jackets (Figure 6b–d). Only five specimens stood out. Two, with $f_{co} = 169.7$ MPa, were tested by Berthet et al. [39] in their investigation of the mechanisms of confinement for ultra-high-performance concrete (UHPC) wrapped in carbon FRPs. The other three specimens were tested by Lim and Ozbakkaloglu [147]. These specimens were wrapped in aramid FRPs with an average $f_{co} = 121.15$ MPa. The total number of high-unconfined-concrete-strength specimens was 197, which was considerably lower than the number in the low/normal-concrete-strength category, which included 960 specimens. This large difference was expected, since confinement is mainly used to increase the strength of substandard or old structural elements that exhibit relatively low compressive strength.

A total of 313 specimens were cast in FRP tubes. The frequency-count plots of f_{co} for the normal- and high-concrete-strength tube-confined specimens are shown in Figure 7a,b, respectively. The unconfined concrete strength of the tube-encased specimens ranged from 12.1 MPa to 55 MPa in the category of normal concrete strength, with a median of 36.30 MPa and an average of 39.14 MPa (Figure 7a). A total of 178 specimens were included in this group. The category of high concrete strength (Figure 7b) comprised 135 specimens, whose unconfined concrete strength varied from 55.6 MPa to 110.1 MPa, with a median of 84.69 MPa and an average of 82.54 MPa.

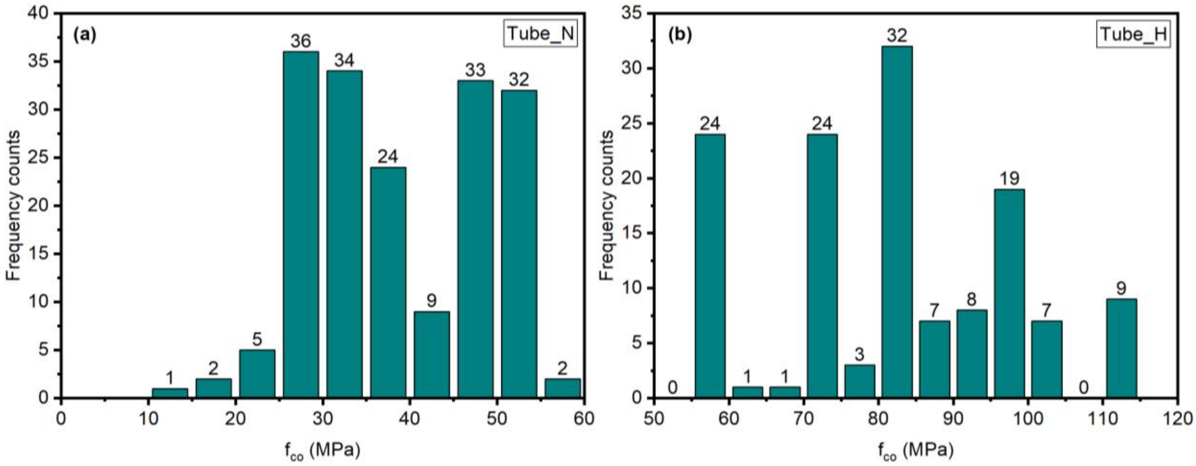

Figure 7. Unconfined concrete strength (f_{co}) of tube-encased specimens, for normal and high compressive strength: (**a**) f_{co} up to 55.5 MPa and (**b**) f_{co} higher than 55.5 MPa.

3.2. Effect of FRP Type on Concrete Confined Compressive Strength

The 1470 cylindrical concrete specimens were confined by composite jackets with diverse properties. In addition to the mechanical characteristics of the composites (Young's modulus, maximum tensile strength, etc.), other parameters, such as the application procedure, may play an important role in the contribution of confinement in terms of strengthening. However, in this study, only the effect of the fiber type used for confinement was examined. Figures 8–10 highlight the impact of each fiber type in the low-, normal-, and high-strength concrete categories, respectively. The relative frequency plots presented in these figures use as a variable the confinement ratio f_{cc}/f_{co}, which is a quantitative measure of the confinement performance. The bars indicate the probability of reaching a particular value of the confinement ratio f_{cc}/f_{co}. The latter is calculated as the ratio of the number of specimens for which a specific value of f_{cc}/f_{co} is reached to the total number of tested specimens.

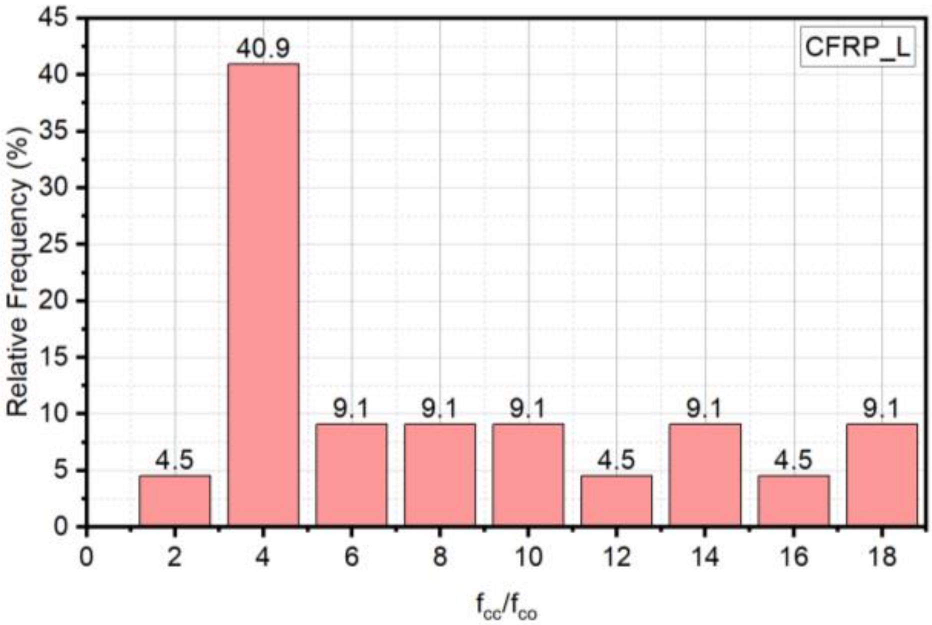

Figure 8. Ratio of confined (f_{cc}) to unconfined concrete strength (f_{co}) of low-compressive-strength specimens confined with CFRP.

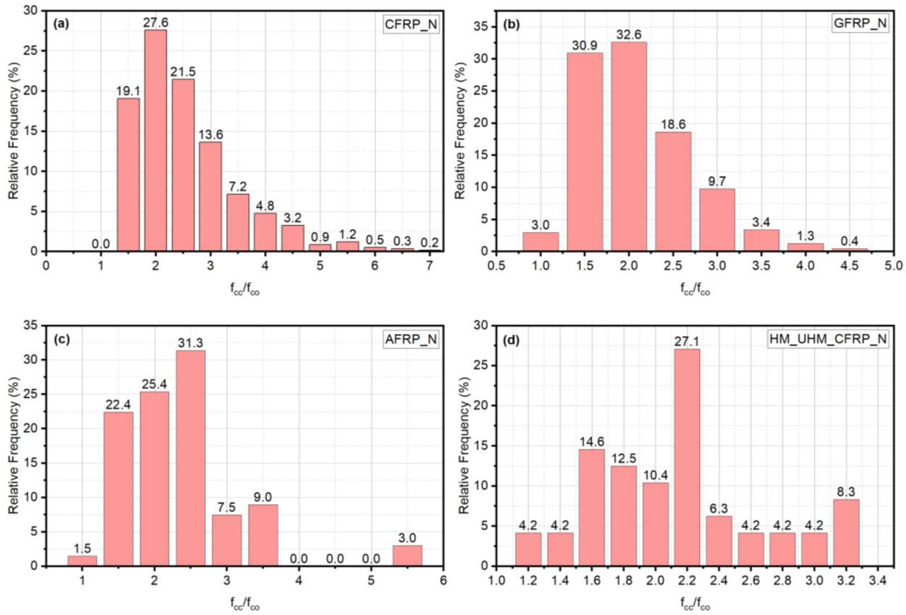

Figure 9. Ratio of confined (f_{cc}) to unconfined concrete strength (f_{co}) for normal-compressive strength-specimens, according to confining material: (**a**) CFRP; (**b**) GFRP; (**c**) AFRP; and (**d**) HM_UHM_CFRP.

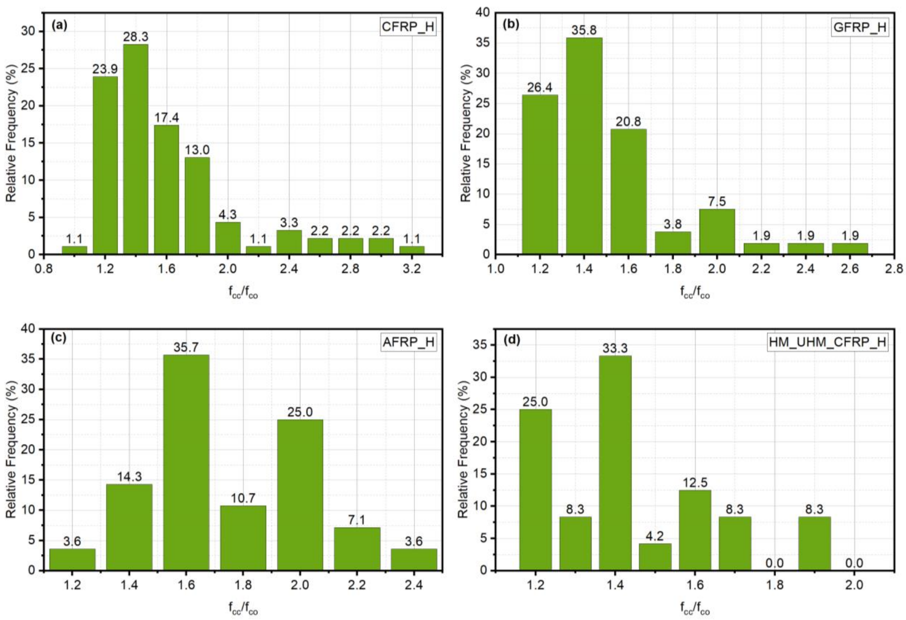

Figure 10. Ratio of confined (f_{cc}) to unconfined concrete strength (f_{co}) for high-compressive-strength specimens, according to confining material: (**a**) CFRP; (**b**) GFRP; (**c**) AFRP; and (**d**) HM_UHM_CFRP.

The first examined category, which included low-strength-concrete specimens, accounted for only 22 specimens, or 1.5% of the total specimens in the database. According to Figure 8, almost 95% of the specimens wrapped with carbon fibers exhibited a strength at rupture that was at least three times higher than that of the unconfined concrete compressive strength. It is really impressive that in some cases, the confined concrete exhibited compressive strength that was as much as 17 times higher, according to Ilki et al. [16].

The effects of the confinement were found to be less pronounced when examining the specimens with normal unconfined concrete strength (Figure 9). According to the plots shown in Figure 9, 31.8% of the 587 specimens with normal concrete strength exhibited a confinement ratio of at least three when confined with carbon fibers (CFRP_N). The corresponding percentages for glass (GFRP_N), aramid (AFRP_N), and carbon fibers with high or ultra-high elasticity moduli (HM_UHM_CFRP_N) were 14.8%, 19.5%, and 12.5%, respectively. Therefore, carbon fibers seem to be more efficient as confinement materials than glass and carbon fibers with high or ultra-high elasticity moduli.

In general, GFRPs appear to have increased the compressive strength by up to 3.5 times for 98.3% of the specimens. A very similar result was observed for the 97.0% of the specimens confined with AFRP jackets. The confinement ratio was limited to 3.2 when high-modulus fibers were used in the composite jackets. The use of carbon fibers appears to have resulted in a confinement ratio of up to six for 97.92% of the specimens presented in this study. When examining the CFRP-strengthening results in Figure 9a,d, it is obvious that the modulus of elasticity appears to be a determining factor in the confinement efficiency.

The confinement ratios and, thus, the confinement-efficiency values, were less pronounced in the second category, that of high-unconfined-compressive-strength specimens, in which the highest f_{cc}/f_{co} increases reached 3.14, 2.46, 2.37, and 1.9 for CFRP_H, GFRP_H, AFRP_H, and HM_UHM_CFRP_H, respectively. However, as shown in Figure 10, the majority of the confined concrete specimens exhibited a 60% increase in compressive strength. The impact of the fiber's modulus of elasticity was even less clear (Figure 10a,d) compared to the normal-strength specimens. One could claim that the use of ultra-high-modulus carbon fibers results in smaller increases in compressive strength compared to the use of common carbon fibers. As shown in Figure 10d, it is obvious that approximately 67% of the confined specimens with high-modulus carbon fibers had an increase in compressive strength of less than 50%, whereas only 53% of the confined specimens with normal-modulus carbon fibers fell within this strength-increase range. Moreover, more than 16% of the CFRP_H concrete specimens had an increase of more than 100%. As mentioned previously, the higher the f_{co}, the more difficult it is to achieve a high confinement ratio.

The 313 tube-encased concrete specimens accounted for 21.3% of the total number of specimens in the database. Due to the relatively small specimen number, it was decided to group all the specimens, regardless of fiber type. As shown in Figure 11a, 95.6% of the normal-unconfined-strength specimens exhibited a compressive-strength increase of up to 3.5 times, whereas the maximum increase for the high-strength concrete was limited to 2.29 times the original value (Figure 11b).

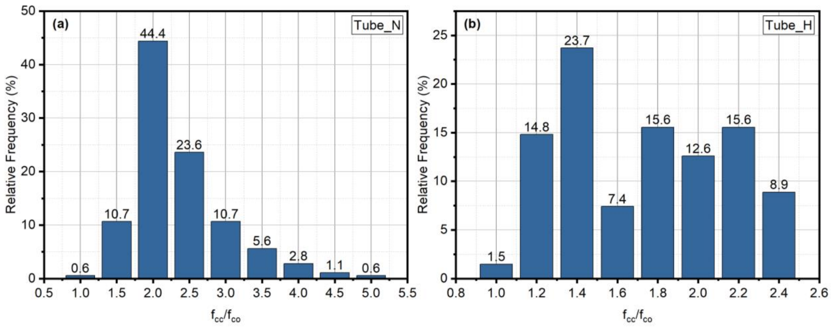

Figure 11. Ratio of confined (f_{cc}) to unconfined concrete strength (f_{co}) of tube-encased specimens, for normal and high compressive strength: (**a**) f_{co} up to 55.5 MPa and (**b**) f_{co} higher than 55.5 MPa.

In order to investigate the effect of the unconfined concrete compressive strength on the confinement ratio, regardless of the confining material, the average confining ratios for low, normal, and high concrete compressive strength (Figure 12a) for all the FRP-wrapped specimens were investigated. It is quite clear that it was easier to achieve the highest confinement ratios with low f_{co} than with the other two concrete categories. Generally, as mentioned previously, the confinement ratio is inversely proportional to the unconfined concrete strength. The same conclusion applies to tube-encased specimens (Figure 12b), in which the higher the f_{co}, the smaller the increase in the confinement effect. The effect was less pronounced when normal- and high-strength concrete specimens were compared.

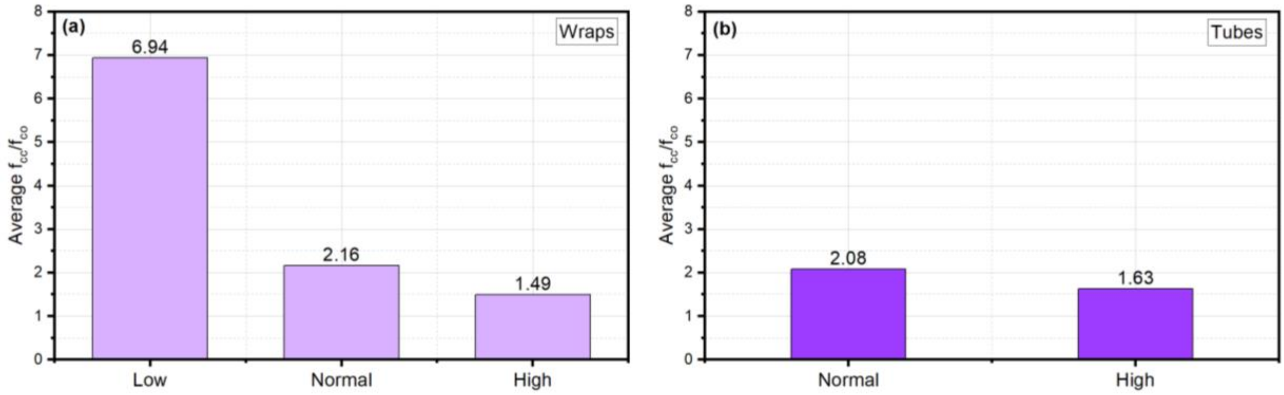

Figure 12. Average ratio of confined (f_{cc}) to unconfined concrete strength (f_{co}) with low, normal, and high compressive strength (f_{co}) (**a**) for FRP-wrapped specimens and (**b**) for tube-encased specimens.

When the average ratio of the confined to the unconfined concrete strength (f_{cc}/f_{co}) for the normal-strength concrete by material (Figure 13a) was examined, the carbon fibers were found to outperform the aramid and glass fibers in strengthening the FRP-wrapped specimens. This can be explained by the fact that the average axial rigidity of the carbon fibers used in the wrapped specimens was 2.4 GPa, while for the glass and aramid fibers, the average values were 1.1 GPa and 1.3 GPa, respectively. The axial deformability of the composite jacket also seems to have affected the confinement ratio since, in the high-strength specimens, the highest confinement ratio was exhibited by the aramid-confined specimens (in this case, the axial rigidity of the CFRP was similar to that of the AFRP). Moreover, a similar trend was identified in the tube-encased specimens. The GFRP tubes that exhibited the highest ultimate axial deformation seem to have offered the best improvements in the compressive confined strength of the concrete (Figure 13b).

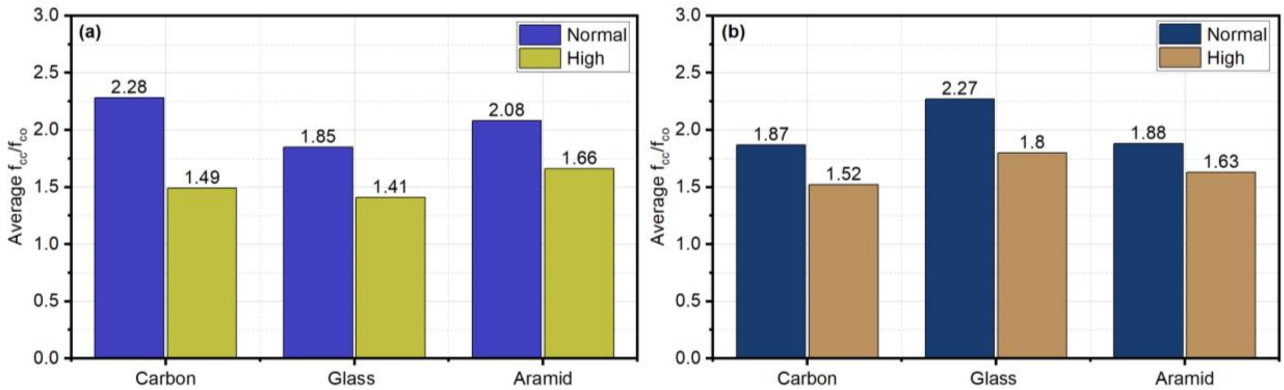

Figure 13. Average ratio of confined (f_{cc}) to unconfined concrete strength (f_{co}) according to the material for (**a**) FRP-wrapped specimens and (**b**) tube-encased specimens.

3.3. Effect of FRP Axial Rigidity on Confinement

Several researchers have mentioned that the axial rigidity affects the confinement ratio, and it is included directly or indirectly in most of the analytical models used to predict confined compressive strength [112,160,161]. The impact of the axial rigidity ($\rho_f E_f$) on the ultimate axial compressive stress of FRP-confined concrete (f'_{cc}), is illustrated in Figure 14. The Kendall correlation coefficient was calculated using a two-tailed test equal to 0.58663 for the FRP-wrapped specimens and 0.5406 for the tube-encased specimens. The Kendall coefficient was chosen because it is known to provide better statistical properties than Spearman's [162]. In both cases, the null hypothesis of the t-test, that there is no correlation between the two variables, results in a zero *p*-value, indicating the significant correlation between the two variables (Table 5). Although some scatter is obvious, the general trend that can be seen in Figure 14 is that the confined compressive increases with the axial rigidity.

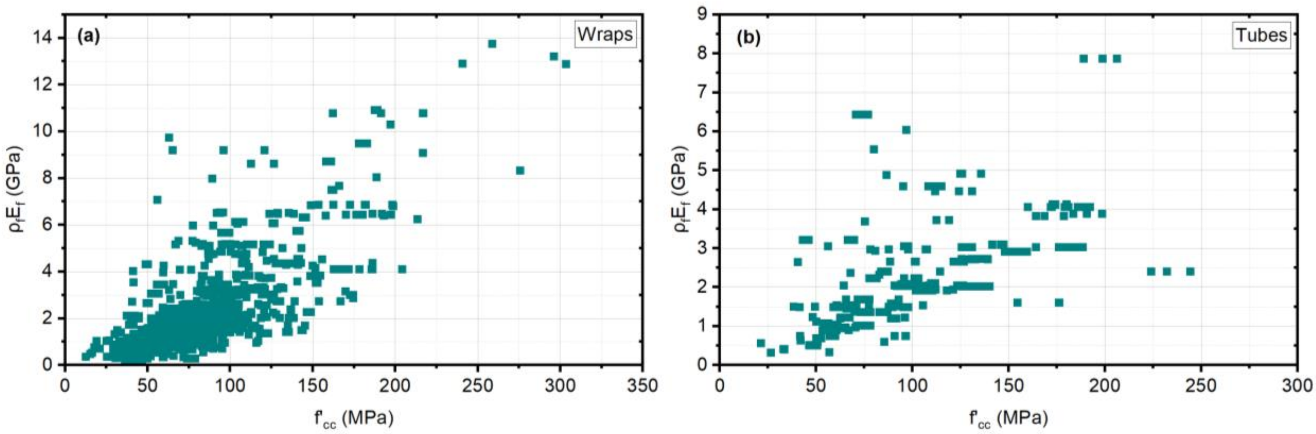

Figure 14. Kendall correlation coefficient of axial rigidity ($\rho_f E_f$) and ultimate axial compressive stress of FRP-confined concrete (f'_{cc}) for (**a**) FRP-wrapped specimens and (**b**) tube-encased specimens.

Table 5. Kendall correlations.

		Wraps		Tubes	
		$\rho_f E_f$ **(GPa)**	f'_{cc} **(MPa)**	$\rho_f E_f$ **(GPa)**	f'_{cc} **(MPa)**
$\rho_f E_f$ (GPa)	Kendall Corr.	1	0.58663	1	0.5406
	p-value	-	0	-	0

3.4. Ultimate Axial Deformation

The impact of the confinement on the specimens' ultimate axial deformation (Figure 15a) was even more pronounced than that of the compressive strength. The unconfined axial concrete strain under the ultimate compressive stress had an average recorded value of 0.25%. The confinement with wrapped FRP jackets led to a significant increase in the average axial strain, since it reached the value of 1.71% (an increase of more than 680%) when low-compressive-unconfined-strength concrete was used [16]. Regarding the tube-encased specimens (Figure 15b), the average deformation of the confined specimens reached 1.94%, which corresponds to an increase of approximately 840%. The superiority of the performance of the tubes compared with that of the wraps can be explained by the better quality of their fabrication. In many instances, the FRP tubes were prefabricated in factories under strict quality control, while the wrapped specimens were fabricated in laboratories using hand layup.

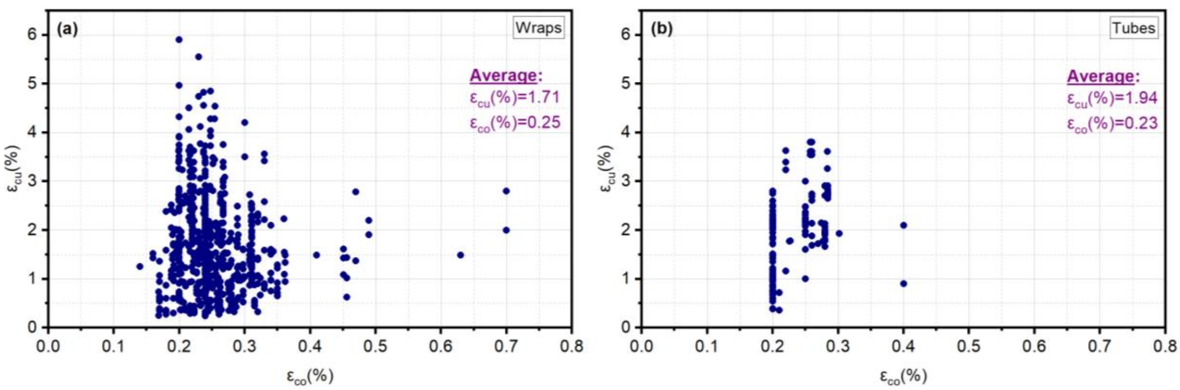

Figure 15. Ratio of unconfined concrete strain (ε_{co}) to ultimate axial compressive strain of confined concrete (ε_{cu}) for (**a**) FRP-wrapped specimens and (**b**) tube-encased specimens.

4. Conclusions

This manuscript introduces the most extensive experimental database of uniaxial compressive tests conducted on FRP-confined cylindrical concrete specimens. This experimental database consists of 1470 specimens and offers a significant tool for the analysis of concrete confinement. More specifically, the scientific community can utilize this database to develop empirical models to predict the effects of confinement using different confining materials and concrete properties. Extensive and accurate databases of the type presented in this study have proven to be valuable tools for determining the effectiveness of FRP composites [15,163].

An interesting finding was the great variability among the experimental methods used to obtain the mechanical properties of the composite jacketing materials. Furthermore, the researchers used a wide array of experimental setups, some of which may have led to ambiguous results. Furthermore, some of the researchers failed to publish critical information regarding the experimental setup used or the material properties.

The analysis of the database indicates that unconfined concrete strength plays a very important role in the effectiveness of confinement. The use of different fiber types as composite materials can affect the ultimate conditions, with CFRP jackets producing higher confinement ratios than those based on glass and aramid. This effect is even more pronounced when lower values of unconfined concrete are used. Moreover, a significant correlation was identified between the axial rigidity of the composite jacket and the confined compressive strength.

Finally, the impact of confinement was most noticeable when examining the increases in the longitudinal ultimate strains. The ultimate longitudinal strains increased, on average, by more than 600% compared to the unconfined concrete strains under ultimate stress. In terms of the ultimate strain increases, the specimens cast in FRP tubes performed somewhat better than the FRP-wrapped concrete specimens.

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