# Chapter 3
# Potential Applications

## 3-1. Application Categories

FRP composites were initially used in advanced technology applications, such as the aerospace industry. Presently composite materials are being used in a number of civil engineering applications including Corps of Engineers projects as described in Appendix B. It is expected that additional applications will be possible on future projects. The various types of applications possible with FRP composites are shown in Table 3-1 and are classified as immediate, short term, and long term. As can be seen, a large number of applications are included in the immediate and short-term categories which indicates that implementation of FRP composites is possible on projects nearing the design phase. Applications listed in the short- and long-term categories will not be widespread primarily due to the lack of codes and standardization. Also, listing items in the short- and long-term categories is not intended to discourage the implementation of innovative concepts using FRP composites on demonstration projects. The meanings of immediate, short-term, and long-term are provided in the paragraphs below.

**Table 3-1**
**Composite Material Applications**

| Category | Applications |
|---|---|
| Immediate | Grating |
| | Fenceposts |
| | Signposts |
| | Handrails |
| | Trashracks |
| | Bearing supports |
| | Bearing plates |
| | Ladders |
| | Small pipes |
| | Cable tray racks & pipe hangers |
| | Light posts |
| | Sluice gates |
| | Sewer pipes |
| | Mechanical & electrical parts |
| | Electrical isolation structural members |
| | Noncritical load-bearing structures |
| | Culverts at small pump stations |
| | Culverts at levee outlet structures |
| | Light-gauge sheetpile |
| Short term | Gates |
| | Gate components |
| | Frames made from pultruded structural members |
| | Concrete repair (plates and wraps) |
| | Noncritical reinforcing |
| | Heavy-gauge sheetpile |
| Long term | Reinforcing |
| | Post-tensioning |
| | Prestressing |
| | Load-bearing piles |

## 3-2. Immediate Category

Applications that are included in the immediate category of Table 3-1 are those applications that could be included in project designs currently being developed. Many of the items listed in Table 3-1 as immediate are currently in use on Corps of Engineers projects. Some of the items in the immediate category may not be in use yet but are included in the list because they are not critical structural items and would not compromise safety if used.

## 3-3. Short-Term Category

Items listed in the short-term category of Table 3-1 are applications which may be implemented in designs to be completed within the next five years. Design information beyond what is currently available will be required before they will be ready for routine use in a service environment. This may include certified test data on the materials to be used in the application or tests on a given connection detail to determine its load-carrying capacity. Approval from CECW-ED is required prior to using FRP materials for the items listed in the short-term category of Table 3-1. Should FRP materials be used for the short-term applications, sharing of information about such applications with other field offices is encouraged.

## 3-4. Long-Term Category

Long-term items listed in Table 3-1 are applications which may not be appropriate for use in project designs until after the year 2000. Sufficient long-term durability data are not currently available to permit these applications, but code development is currently under way. Despite the fact that these items have significant potential for use in Corps of Engineers projects, caution should be exercised when considering FRP materials for these applications since in many cases the long-term effects have not been fully documented. As research continues on FRP composite materials, information may become available which will provide the data necessary to support the use of FRP composite materials for the long-term applications given in Table 3-1. Opportunities to use applications in the long-term category for demonstration projects or on

projects that are not of a critical nature should be investigated but should not be implemented without the approval of CECW-ED.