Embedded systems often incorporate loops with sleep or delay commands to manage system behavior efficiently. First off, it prevents loops from consuming excessive CPU resources by running incessantly at full speed. Issues like these cause devices to have unnecessary power drain, or overheating. In addition to that, it ensures additional operations like sensor readings or display updates that happen at controlled intervals.

For the display board, it introduces a necessary pause to ensure the display has enough time to process the commands & data correctly. They require a small amount of time to execute coded operations such as clearing the screen, moving the cursor, & printing or displaying text.

The purpose of having text displayed on lcd devices is to assist communication between the system & the user. This allows for real-time feedback such as operational status, error messages or sensor readings which are essential for reading functions & troubleshooting. Outside of practical utility, text displays can be used as an interface in environments where graphical interfaces are impractical or unnecessary. Their simplicity makes them reliable & easy to implement, even in resource-constrained systems.

Display behavior can be effectively modeled using a state machine, where each screen corresponds to a distinct system state. Display machines can be used as standby messages, like message boards on the side of the freeway, or active boards like banners that display multiple messages based on time. Transitions between these states, likely triggered by external events like button presses or senso inputs, result in corresponding updates to the displayed text. This structured approach simplifies programming logic while also ensuring the user receives clear & contextually relevant information.

By using all of these different concepts, embedded systems can achieve efficiency & usability. The implementation of delays optimizes performance, while text output can help understandability between the system & its user. When combined with state machine principles, the display becomes an intuitive reflection of the system’s inner workings, enhancing both functionality and user interaction. Together, these elements underscore the importance of careful design in embedded applications.