

住宅建築 活動과 木質 및 木造建築의 研究動向

House Construction Activities and Research Trend of Wood Based Materials and Wooden Construction

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要 約

最近 우리나라에서는 木材外의 他界材料로의 建築이 이루어지고 있으므로 木造建築에 관한 研究와 關心이 急速히 減少하고 있다. 이것은 國內에서의 木材生産이 極히 低調하고 價格의 暴騰으로 나타난 必然的인 現象이라 하겠으나 木造建築이 아닌 他界材料로 施工한다고 하여도 木材는 꼭 쓰여지기 마련이다. 그러므로 住宅을 中心으로 各種建築物의 構造를 理解함으로써 보다 合理的인 木材利用을 꾀할 수 있을 것이다.

특히 木造住宅에 依存하고 있는 美國에서 輕構造(light frame house construction) 또는 組立式建築(prefabricated house construction)에 依한 木造住宅建設에 관한 새로운 研究가 着實하게 進行되어 큰 成果를 거두고 있어서 값싼 住宅의 量産에 많은 도움을 주고 있음은 勿論이고 農用建築物의 建設에도 크게 活用되고 있다. 더구나 8時間만에 한 채의 住宅을 建設할 수 있는 8時間建築(8 hours house construction)의 體系가 研究開發되어 增加一路의 住宅需要를 메꾸어 나가고 있어서 우리나라에서도 이 方面에 관한 研究가 推進되어야 할 것으로 믿는다.

1. 緒 言

最近 우리나라에서는 住宅建設과 需要에 關係하여 적지않은 論難이 일고 있다. 갑작스레 밀어닥친 西歐化로 인하여 傳統的인 大家族 單位의 生活이 核家族化함에 따라 小型住宅의 需要가 爆發的으로 增加하고 있음에도 國家의 財政形便과 國家經濟의 不況으로 供給에 큰 차질을 빚고 있는 實情이다. 따라서 現如件下에서 값싼 住宅을 손쉽게 建設할 수 있는 方案을 構想하고 이를 實踐할 수 있는 많은 研究가 必要하다고 생각한다.

우리나라에서는 現在 거의 大部分이 木材外의 他

界材料로 建築이 이루어지고 있으므로 木造建築에 관한 研究와 關心이 急速히 減少하고 있다. 이것은 國內에서 木材生産이 極히 低調하고 價格의 暴騰으로 나타난 必然的인 現象이라 하겠으나 木造建築이 아닌 他界材料로 施工한다고 하여도 量的 差異는 있으나 木材는 꼭 쓰여지기 마련이다. 그러므로 木造住宅을 中心으로 各種建築物의 構造와 近來의 研究動向을 理解함으로써 合理的인 木材利用을 꾀할 수 있을 것이다.

특히 住居生活에 있어서 主로 木造住宅에 依存하고 있는 美國에서는 輕構造住宅建築(light frame house construction), 組立式住宅建築(prefabricated or modular house construction)과 移動式住宅建築(mobile home construction) 등에 관한 住宅建設 研究가 多年間에 걸쳐 着實하게 進行되어 큰 成果를 거둔바 있어서 값싼 住宅의 量産에 많은 도움을 주고 있음은 勿論이고 農用建築物와 一般建築物의 建設에도 크게 活用되고 있다. 더구나 8時間만에 한 채의 住宅을 建設할 수 있는 8時間住宅建設(8 hours house construction)의 體系가 概念만으로도 아니고 研究 開發되어 實踐에 옮겨짐으로서 增加一路의 住宅需要를 메꾸어 나가고 있어서 우리나라에서도 이 方面의 研究가 推進되어야 할 것이다.

또 國內의 住宅建設과는 無關한 것이라 하겠으나 住宅用資材 輸出面에 있어서도 우리나라에서는 美洲 西海岸 地域에서 針葉樹 原木를 導入하여 이를 製材 製品으로 加工한 다음 다시 美國과 日本 等地로 再輸出 한다는 事實을 알고 있다면 美國과 日本의 建築活動과 그 研究動向을 자세히 認識하고 이에 對應하는 製材工業의 發展이 必要할 것이다. 특히 組立式住宅의 部品 生産과 이를 輸出할 수 있는 可能性을 開發 研究함도 重要的 일로 생각하고 있다.

本稿에서는 木造住宅을 많이 建設하고 있는 美國과 日本 그리고 韓國에 있어서의 住宅建設活動을 記述하고 最近 木造建築 特別히 住宅의 材料와 建設에 關한 重要的 研究文獻을 紹介하여 最近의 研究動向을 理

解하는데 도움을 주고자 마련 하였다.

2. 우리나라의 住宅建設

最近刊 東亞年鑑(1982)에 따르면 1980年 現在 우리나라의 總 733萬 1千 家口數에 546萬 3千戶로서 住宅供給率은 74.5%에 達한다. 그러나 年度別 供給率은 1960年度 82.5%, 1970年度 78.2%, 1978年度 76.7%, 1979年度 76.5%로서 해가 바뀔에 따라서 供給率이 크게 낮아진 것을 알 수가 있다. 뿐만 아니라 1980年度 現在 農村의 住宅供給率이 100.1%로서 오히려 남아도는 狀態를 보여주고 있으나 都市地域에 있어서의 供給率은 63.3%에 不適當으로 都市에서는 住宅難이 매우 심각한 實情이다.

1980年度의 人口 및 住宅 센서스에서 밝혀진 바로는 總家口數 546萬 3千戶 가운데서 單獨住宅이 475萬 6千戶로서 87.1%를 點하고 있으며 아파트와 聯立住宅인 共同住宅은 58萬 1千戶로서 10.6%를 點하고 있어서 單獨住宅이 거의 大部分을 點하고 있다. 그러나 共同住宅은 國民의 核家族化 추세로 미루어 보아 單獨住宅보다 크게 늘어날 展望이다. 한편 住宅當 平均 建坪規模를 보면 1970年度에 13.8坪이던 것이 1975年度 17.5坪, 1980년에는 19.3坪으로 차츰 그 規模가 增加하고 있음을 보여 주었고 都市와 農村地域의 建坪規模에서도 큰 差異를 나타내고 있어서 1980年度의 農村住宅의 平均建坪은 16.9坪인데 反하여 都市住宅의 平均建坪은 22坪이었다. 특히 서울地域의 平均建坪은 24.2坪이나 되어서 他地域보다 住宅規模가 크다는 것을 보여 주었다.

政府는 1982년부터 1986년까지 施行하는 第5次經濟社會開發 5個年 計劃期間中에 146萬戶의 住宅을 建設할 것으로 알려져 있다. 이 計劃에 따르면 公共部門에서 57萬戶, 民間部門에서 89萬戶를 建設함으로써 1980年度의 住宅供給率 74.5%에서 1986年度에는 78.4%까지 끌어올리는 것으로 되어 있다. 또, 이 計劃 속에는 長期住宅建設計劃으로 1981년부터 公共住宅 200萬戶 民間住宅 300萬戶 等 500萬戶를 建設하게 되어 있어서 매우 意慾의인 것으로 생각된다.

3. 美國의 住宅建設 活動과 將來의 需要

最近 美國의 住宅建設 活動에 關해서 美農務省 林

產物研究所의 H.E.Dickerhoof와 T.C.Marcin(1978), Marcin, T.C. (1977, 1978) 그리고 美國商務省 Bureau of Census (1978)의 報告 및 R.N.Stone과 G.A.McSwain(1980) 등의 報告를 綜合하여 보면 住宅保有數는 1978年 現在 約 8千 2百 8拾萬戶이며 1973년부터 1979年度까지의 年間 住宅建設數는 單獨, 共同 및 移動式住宅을 包含하여 1973年度에 262萬 4千戶, 1974年度 168萬 1千戶, 1975年度 138萬 4千戶, 1976年度 179萬 3千戶, 1977年度 226萬 6千戶, 1978年度 229萬 9千戶, 1979年度에 201萬 5千戶를 記錄하고 있어서 1975年度の 같이 建設活動이 매우 저조한 해도 있었으나 대체로 200萬戶 前後의 住宅을 每年 建設하고 있음을 알 수 있다.

특히 1978年度の 住宅建設이 크게 回復하고 있음을 나타내고 있으나 1973年度の 建設實績인 262萬戶에는 미치지 못하고 있다. T.C. Marcin(1977)의 研究 報告한 바에 따르면 國民總生産이 每年 3.7%로 正常成長을 繼續할 때 美國의 將來 住宅需要를 豫測分析한 結果 1982년부터 1989년까지 大體로 向後 8年間은 每年 250萬戶 以上の 큰 住宅需要를 맞고 있어서 어려운 環境에 놓일 것으로 分析하고 있으며 그 以後 2020년까지는 2010年의 250萬戶의 需要를 除外하면 住宅需要가 보다 완화될 것으로 展望된다. 또 國民總生産量이 每年 約 2.7%로 低成長을 한다고 가정한다면 大體로 1978年의 210萬 9千戶로부터 차츰 需要가 增加하여 1983년에는 241萬 1千戶로 最高度에 達하게 되며 其後에는 차츰 減少하여 1991년부터 2015년까지는 200萬戶 前後의 需要를 갖을 것으로 豫상하고 있으며 其以後 2020년까지는 더욱 需要가 減少하여 每年 大略 185萬戶의 需要가 있을 것으로 分析하고 있다.

그리고 T.C. Marcin(1977)이 같은 報告內에서 住宅構造別 需要를 分析豫測한 바에 따르면 正常經濟成長의 경우 1978年度の 住宅需要 總數 221萬 5千戶中에서 單獨住宅이 135萬 1千戶, 共同住宅이 53萬 4千戶, 移動式住宅이 32萬 9千戶를 點하고 있다. 따라서 單獨住宅과 共同住宅을 合한 188萬 6千戶에 對한 單獨住宅 點有率이 71.7%로서 그 需要가 크다는 것을 알 수 있다. 또 2020년에는 住宅總需要 222萬 5千戶中에서 單獨 134萬 3千戶, 共同 50萬 5千戶, 移動式이 37萬 7千戶를 點하게 되며 單獨과 共同住宅 總數 184萬 8千戶에 對한 單獨住宅 點有率은 72.7%로서 1978年度와 크게 變動이 없을 것으로 展望하고 있다. 그러나 每年 住宅建設로 인하여 除去되는 住宅數를 除外하여도 住宅 總

保有數는 계속 增加하여 2020 년에는 約 1億3千5百6拾七萬戶에 達할 것으로 分析하고 있다.

4. 日本의 將來 住宅需要

前述한 바와 같이 美國의 住宅保有 總數는 1978 年度基準으로 8千2百8拾萬戶인데 比하여 日本의 1979 年度의 住宅保有 總數는 3千4百1拾萬戶 정도인 것으로 알려져 있어서 人口의 比率을 고려하지 않는다면 그 規模가 一層적하다는 것을 알 수 있다.

Michikiko Ueda와 David R. Darr (1980)의 研究報告에 의하면 西紀 2000 년까지 正常經濟成長을 지속한다고 할 때 每年 새로 形成된 家口主 數는 1979 年度에 75萬9千戶이던 것이 차츰 減少하여 1985 년에 68萬5千戶, 1990 年 60萬2千戶, 1995 年 51萬9千戶, 2000 년에는 43萬4千戶로 차츰 需要幅이 줄어드는 것으로 分析하고 있다. 그러나 總住宅保有數의 變動은 1979 年度의 3千4百41萬7千戶이던 것이 차츰 增加하여 1990 年에 4170萬1千戶이고 2000 년에는 4684萬戶에 達할 것으로 分析하고 있다.

또 首相室(Office of Prime Minister; 1959 ~ 1979)의 報告에 의하면 1958 년부터 1978 년까지 過去의 住宅保有數의 變動에 있어서도 1853萬7千戶에서 차츰 增加하여 3365萬8千戶에 達한 것으로 報告하고 있어서 過去로부터 將來에 까지도 保有數가 꾸준히 增加하게 된다는 것을 알 수 있다. 이것은 日本이나 美國이 모두 年間 相當量의 不良住宅을 除去함에도 不句하고 膨脹하는 人口增加로 인하여 必要한 住宅을 계속 建設할 수 밖에 없는 實情으로 이뤄지는 結果라고 하겠다.

또 日本의 過去와 未來에 있어서 철거했거나 除去할 住宅數를 보면 1961 年度에 363千戶로서 總住宅保有數인 19644千戶에 對한 철거率은 1.85%였으며 1970 年度에는 809千戶로 總住宅保有數인 27553千戶에 對한 2.94%로서 最高度에 達하였으나 1977 年度에는 657千戶로 總住宅保有數 34784千戶에 對한 撤去率은 1.89%로 減少하고 있다. 그러나 1985 년에는 撤去率이 2.12%, 1990 년에는 1.97%로 2% 前後를 記錄하겠으나 1995 年과 2000 년에는 各各 1.82%나 1.67%로서 撤去率이 減少할 것으로 展望하고 있다.

따라서 以上에서 說明한 바와 같이 日本에 있어서 새로운 家屋主數와 撤去率을 基準으로 하여 住宅需要를 分析한 Michikiko Ueda와 David R. Darr

(1980)의 結果에 따른다면 正常經濟成長의 경우 1980 年 1605千戶, 1985 年 1690千戶, 1990 年 1610千戶, 1995 年 1550千戶, 2000 년에는 1465千戶의 住宅建設이 必要하다는 것이다. 이로써 住宅需要가 2000 年까지의 未來에는 차츰 減少할 것으로 展望하고 있다.

그리고 새로 建設하는 木造住宅과 非木造住宅의 構成比率을 展望한 首相室(Office of Prime Minister)의 報告에 따르면 1965 年度의 木造住宅의 點有率이 76.7%, 1970 年 69.8%, 1975 年 66.9%, 1980 年 63.0%, 1985 年 60.0%, 1990 年 58.0%, 1995 年 56.0%, 2000 년에는 55.0%로서 木造住宅의 建設이 減少할 것으로 보고 있다. 또 Michikiko Ueda (1979)의 報告에 의하면 1965 년부터 1975 年度까지 建設한 住宅構造別 木材 使用量을 比較하였는데 1 平方미터當 所要木材量은 1965 年에 木造住宅 0.215 m^3 , 콘크리트住宅 0.097 m^3 , 鐵造住宅 0.048 m^3 , 콘크리트 및 鐵造住宅이 0.0073 m^3 였으나 1975 년에는 木造 0.192 m^3 , 콘크리트 0.087 m^3 , 鐵造 0.042 m^3 , 콘크리트 및 鐵造 0.065 m^3 로서 차츰 木材의 使用量이 어떤 形態의 住宅을 建設한다고 하더라도 減少하고 있다고 報告하고 있다.

5. 木質材料 및 木造建築의 研究發展

木造住宅 建設은 1950 年代까지 主로 土壁을 爲主로 하거나 製材로부터 얻어지는 素材로 構成하는 軸造構造法이 盛行하였으나 合板製品의 出現으로 必要한 部分에 판넬을 붙이는 程度의 方式이³ 流行하였다.

그러나 近年에 이르러서 새로운 木質材料로서의 各種 판넬이 出現하므로써 住宅構造用 材料에 큰 變換을 갖쳐오고 있다. 즉, 素材와 合板類로부터 削片板과 纖維板類를 利用하는 方式으로 차츰 研究開發되고 있다. 削片板의 發展은 原來 家具類의 部品을 生産하기 爲해서 研究되어온 것이나 近年에는 美國과 캐나다 等地에서 構造用 파티클보오드의 研究開發에 힘을 기울여 實用化함으로써 住宅構造用材料로서 크게 脚光을 받게 되었다. 그러므로 木造住宅을 建設하기 爲한 木質材料의 研究發展은 構造用 파티클보오드(structural particleboard)의 活用に 기대할 만큼 成果를 올리고 있으며 이밖의 集成構造材의 發展도 最近에 많은 研究에 의한 成果의 結晶으로 이루어진 것이다.

木質材料의 研究發展과 木造建築에 있어서 最近의 研究를 모두 紹介하기로 極히 어려운 것이나 重要

한 研究를 分野別로 발췌하여 그 動向을 간단히 表示하여 보기로 하였다. 本稿에서는 主로 Forest Products Journal(1975~1982)을 主軸으로 하고 Wood and Fiber(1969~1982) 및 U. S. Forest Products Laboratory의 Lists of Publications 과 Research Paper 및 Research Note 그리고 著가 入手한 主要文獻을 中心으로 기재하였음을 알리둔다.

① 合板(Plywood) 分野 의

主要 研究

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④ 木材建築(Wood Construction) 分野 의

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