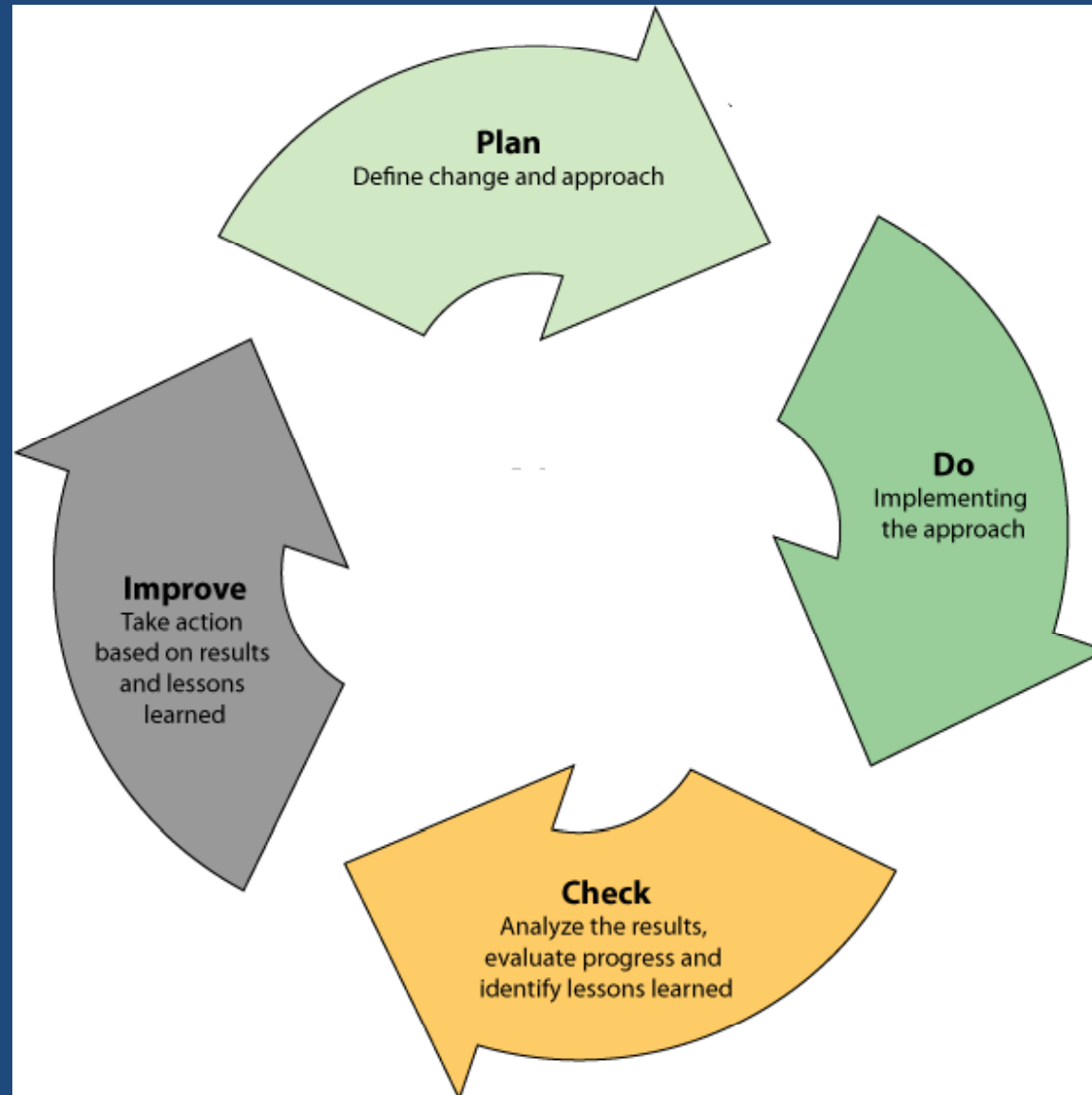
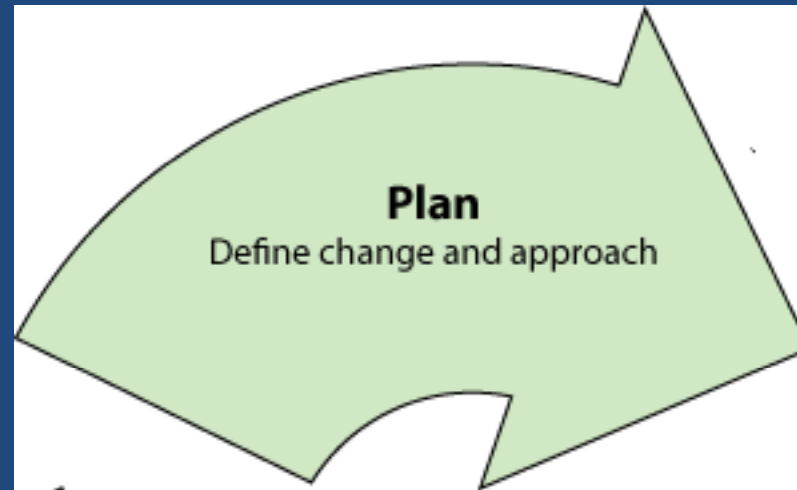


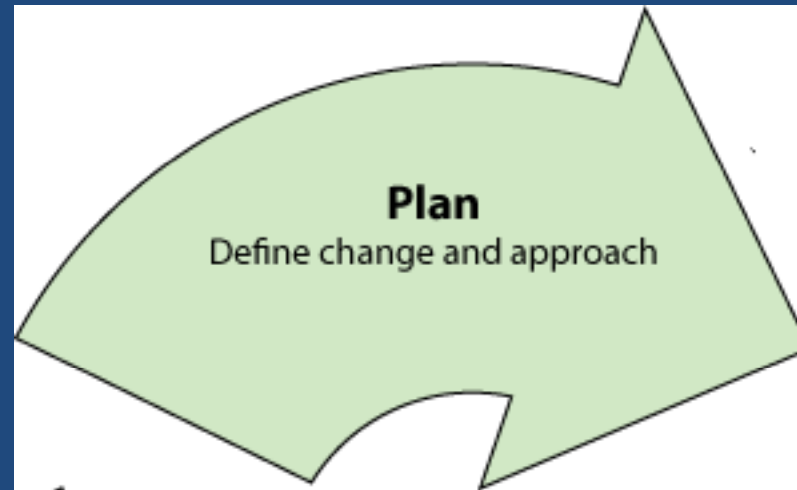
Implementation of EPS Technology



Steven F. Bartlett, Ph.D. P.E

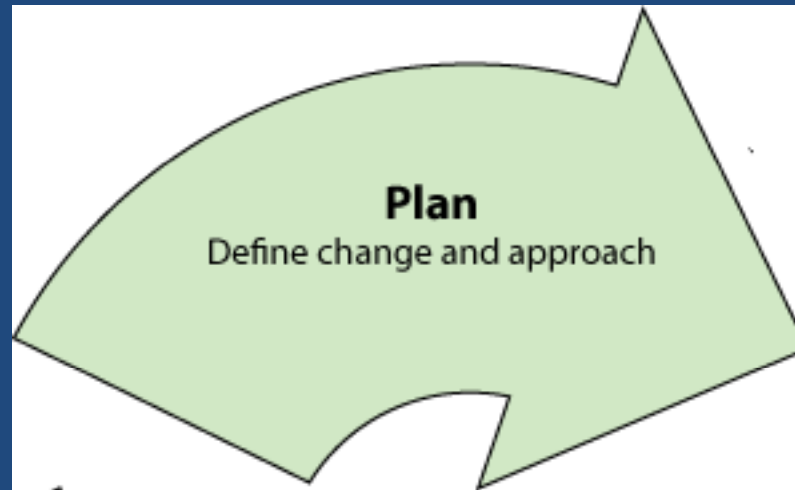


- Research and Development
- Education and Outreach
- Design Methods and Guidance
- Standard Specifications
- Vendor Prequalification



- **Research and Development**

- Norwegian Public Road Administration (1972)
- EPS Construction Method Development Organization (EDO) – Japan (1986)
- German Institute for Road and Transport Research (1991)
- Delft University – Netherlands (1997)
- USA Geofom Research Institutions
 - Syracuse University
 - University of Utah
 - University of Illinois
 - University of Memphis
 - Manhattan College
- Okan University - Turkey



- **Education and Outreach**

- International Conferences

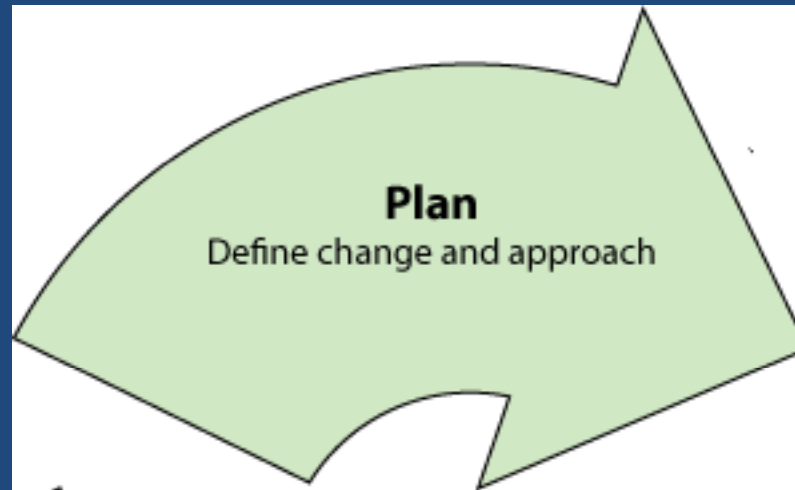
- 1985 – 1st International Conference (Oslo, Norway)
 - 1996 – 2nd International Conference (Tokyo, Japan)
 - 2001 – 3rd International Conference (Salt Lake City, USA)
 - 2011 – 4th International Conference (Oslo, Norway)
 - 2016 – 5th International Conference (Istanbul Turkey?)

- Technical Seminars (Professional Meetings and Societies)

- Informal Working Meetings

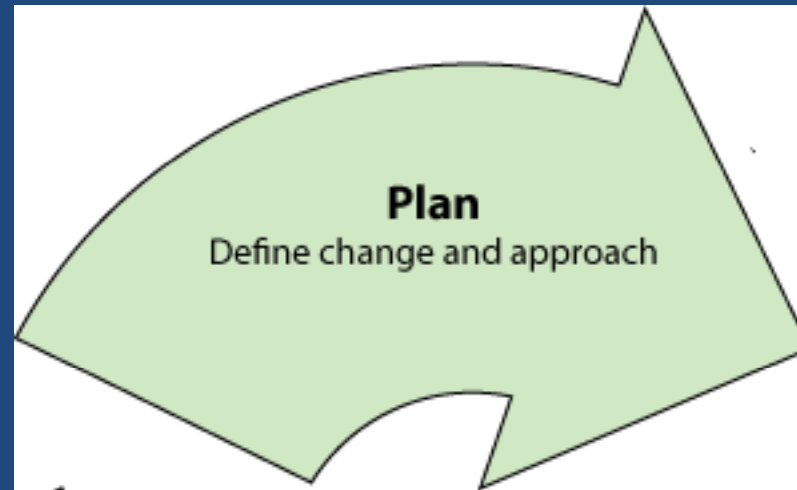
- Skype Conferencing

- Papers and Reports



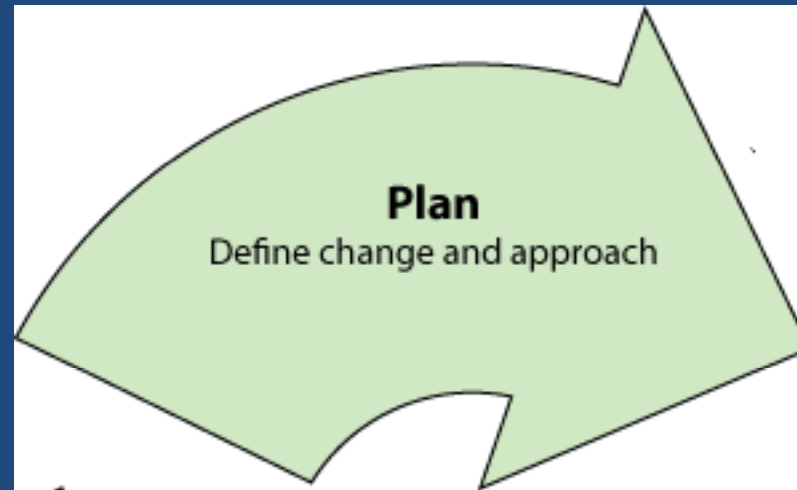
- **Design Methods and Guidance**

- Norwegian Public Roads Administration (1987, 1992, 2002)
 - 2002 Lightweight filling materials for road construction – NPRA Publication No. 100)
- Japanese Practice – EDO (1996, 2001)
 - In Japanese
- Draft European Design Code (1998)
 - I-15 Reconstruction Project (1998-2001)
- USA - NCHRP 529 and Web Document 65 (2004)
- European EPS White Book (2011)
 - EUMEPS Background Information on standardisation of EPS
- USA - NCHRP Project 24-11(02) Phase I Study (slopes) (2011)
- Turkey – Manual of Instruction?



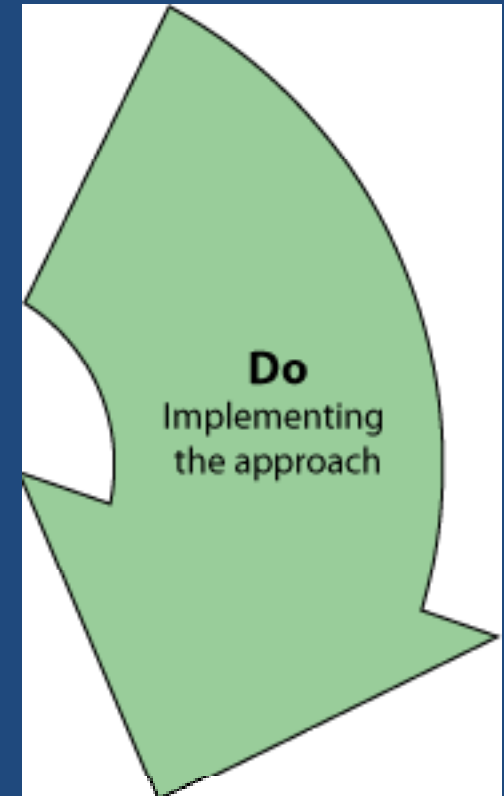
• **Standard Specifications**

- **Material**
 - **ASTM D6817 (USA)**
 - **Thermal insulation and light weight fill products for civil engineering applications. Factory made products of expanded polystyrene (EPS White book and EN 14933) (Europe)**
- **Transport, Handling, Storage**
 - **NCHRP 529 (USA)**
- **Construction**
 - **NCHRP 529 (USA)**
- **Quality Assurance / Quality Control**
 - **NCHRP 529 (USA)**

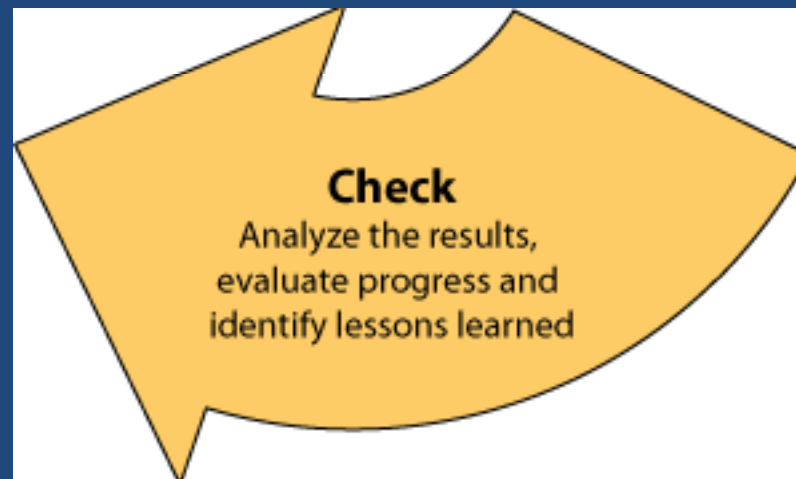


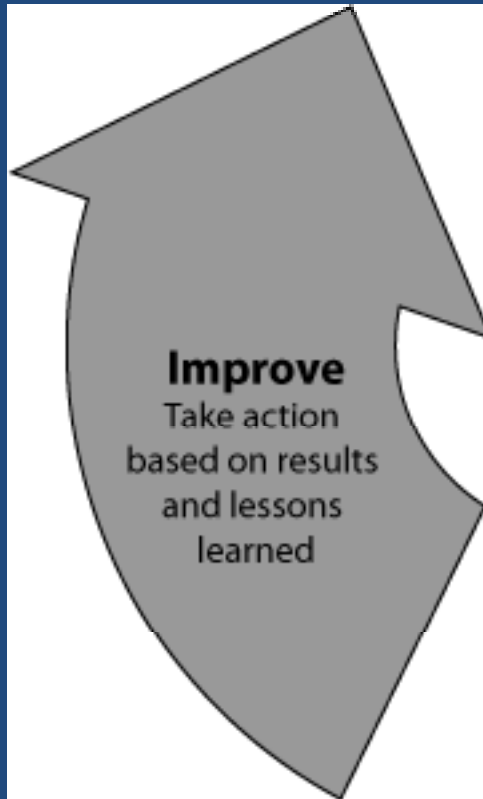
- **Vendor/Supplier Prequalification**
 - Ensures quality of product
 - Development of quality assurance / quality control program
 - Independent laboratory verification
 - Cevkak laboratory
 - U. of Okan?
 - Certification of product
 - Certification of production capacity

- **Selection of Demonstration Project**
- **Performance Requirements**
 - Settlement tolerances, deformations, acceptable factors of safety, construction time, sequencing, etc.
- **Conceptual Design**
- **Selection of Preferred Alternative**
- **Final Design**
- **Costing Estimate and Schedule**
- **Selection of Contractor**
 - Selection of prequalified EPS Vendor
- **Construction**
 - Material manufacturing
 - Product acceptance
 - Quality control testing and records
 - Transportation
 - On-site storage/stockpiling
 - As-built drawings
- **Project Finalization (Acceptance)**



- **Performance Monitoring**
 - Verify performance of geosystem and design
 - Implement field monitoring and instrumentation
 - Foundation deformation monitoring
 - Primary Consolidation Settlement
 - Horizontal movement (slopes)
 - Creep
 - Geofoam
 - Construction movement
 - Long-term creep
 - Stresses, horizontal and vertical
 - Horizontal movement (slopes only)
 - Pavement (survey monuments)





- **Evaluate construction**
- **Evaluate design**
 - Verify against performance goals
 - settlement tolerances
 - deformations
 - schedule
 - cost
- **Evaluate constructability**
- **Recommend actions** based on lessons learned
- **Revise** design guidance, specifications, etc based on findings