Case 4

National Foundations, Inc.

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Kent Smith sits at his desk reviewing his notes on a new product that his company is considering adding. The product, a foundation stabilizing system, could dramatically change the company's product line and growth potential.

Bill and Kent Smith established National Foundations, Inc., in 1978 as a residential foundation repair company. Both brothers worked in another foundation repair company before starting their own business. National Foundations specializes in repair of residential foundations and does no commercial jobs. The need for foundation repair arises when a foundation—usually a concrete slab—settles due to shifting soils, expansion or contraction of soils, or inadequate construction of the original foundation. Repairs normally consist of digging under the existing foundation, jacking the foundation back into position with hydraulic jacks and then pouring new concrete under the foundation. Cosmetic repair of bricks, shrubs, and grass may also be needed to restore the home to an acceptable condition after repair.

The new product under consideration involves the use of a "seep hose" which can be tied to a home's water system to maintain the moisture content of the soil under a foundation. When the moisture content of the soil decreases, the seep hose would replace the moisture to maintain a constant level. The constant moisture content of the soil would conceivably prevent the soil from expanding or contracting when long dry spells or extremely wet spells occurred, thus, preventing foundation problems. However, the founder and patent holder, Dr. Harold Jenkins, had not completed any field-testing of the product.

Consumer Analysis

Smith realized that the need for residential foundation repairs and/or preventive systems is based on two factors: (1) the number of structures existing at a given point in time, and (2) the proportion of these structures experiencing foundation failures of sufficient magnitude to warrant repair. He also knew that the number of existing structures is influenced by population, family formations, income levels, and interest rates; while the proportion of structures needing repairs or preventive systems is determined by bearing soil and climatic conditions and/or inadequate foundation construction. Kent understood that he needed to check each of these factors for reliability before he could estimate the sales volume of the new product.

Residential Housing in the United States

Using the U. S. Census housing data, Smith found that the number of existing residential houses in the United States was 109,800,000 units. Growth in housing units, as measured by new housing starts, has followed the pattern shown in Tables C4.1 and C4.2.

TABLE C4.1. Percent of Homes by Year Built

Year range	Percent of homes built
1990-1994	6
1985-1989	8
1980-1984	8
1975-1979	11
1970-1974	11
1960-1969	15
1950-1959	13
1940-1949	8
1930-1939	6
1920-1929	5
1919-earlier	9
Total	100

TABLE C4.2. New Housing Starts by Year (in Thousands)

Year	Number
1992	1,200
1993	1,228
1994	1,457
1995	1,354
1996	1,477
1997	1,476

Source: National Association of Home Builders (NAHB) housing starts, available online at <http://www.nahb.com/starts.html>.

More relevant to National's planning was the number of homes in the areas most likely to experience the soil and climatic conditions that cause foundation failures. In the continental United States seventeen states have been labeled "problem states" as far as foundation failures are concerned. These states are listed in Table C4.3 along with the number of existing houses in 1999.

Smith planned to use these data to calculate market potential for the sales of the foundation stabilization system in the seventeen problem states. He learned that an estimated 60 percent of all houses built on expansive soils will experience foundation problems of some type. Ten percent of these are estimated to experience problems significant enough to warrant repair. Smith thought that, perhaps, 70 percent of the houses in the seventeen problem states were built on expansive soils.

Market Potential

Table C4.3 shows the total number of houses in each of the seventeen problem states. These data would serve as a basis for estimating total market potential in these states. Table C4.4, in turn, shows the total number of houses for the four cities in which National would initially do business.

TABLE C4.3. Housing in the Seventeen Problem States, 1999

State	Number of houses (in thousands)
Alabama	1,834
California	11,599
Colorado	1,493
Florida	5,474
Kansas	1,194
Mississippi	1,140
Montana	410
Nebraska	781
New Mexico	635
North Dakota	324
Oklahoma	1,546
Oregon	1,354
South Dakota	346
Texas	6,936
Utah	613
Washington	2,111
Wyoming	235
Total	38,025

Source: Robert Wade Brown, *Residential Foundations: Design, Behavior, and Repair,* Second Edition (New York: VanNostrand Reinhold, 1984), p. 18.

TABLE C4.4. Housing in Four Selected Cities

City	Number of houses (in thousands)
Tulsa	195
Oklahoma City	221
Dallas	488
Fort Worth	195
Total	1,099

Consumer and Builder Input

The Smith brothers realized that before they could make a decision on their new venture, they needed to know what home owners and builders thought about foundation problems and repairs. Consequently, they spent many hours interviewing respondents from both groups.

The consumer interviews involved a random sample of home owners in the Tulsa area. The Smiths talked with fifty respondents from a group of home owners who had experienced foundation problems and repairs. This information was used to more precisely estimate repair costs, market share, and interest in the foundation stabilizing system under consideration.

Kent Smith summarized the findings from the home owner survey as follows: of the fifty respondents, frame (wood) (32.3 percent), all brick (31.3 percent), and brick and frame (23.2 percent) were the most popular types of homes. Of the ten respondents who were extremely interested in the system, half (five) had all-brick homes with only one individual with a wood frame home. Brick homes that show exterior cracks are the prime target for such a system.

- Although the homes with crawl spaces (53.7 percent) outnumbered the homes with slabs (43.2 percent), twice as many individuals who were extremely interested in the system had slab foundations.
- The majority of the homes in the survey were 2,000 square feet or less. None of the respondents with 3,000 square feet or more were interested in the system. This is not to say that those individuals with large homes are not interested in such a system. Larger homes may be perceived as better constructed and thus not in need of the system. Interest in the stabilizing system did increase if respondents were aware of problems in their neighborhood. Of those aware of the problems, 44.4 percent said they were extremely interested in the system. This compares with only 6.6 percent who were not aware of problems.
- Those who experienced foundation problems were not more interested in the system than those who had not. The stabilization system may be viewed as either preventing foundation problems

for those who have not had problems or as a stabilization system for those who have experienced problems.

- Of the respondents who experienced foundation problems, 77.8 percent listed foundation settling as the primary type of problem. Exterior cracks were the usual indication of problems. Only 55.6 percent of the respondents had repaired their foundation. The average cost was less than $2,500. Most individuals making repairs spend only a minimal amount while a few must make major costly repairs. Thus, the average cost of repairs is expected to be much greater than just $2,500.
- Of those who were extremely interested in the system and responded to the question on what they expect to pay for the system, more than half responded with greater than $5,000. Thus, for those extremely interested, the present cost of $4,000 does not seem unreasonable.
- When asked if they were still interested if the system costs $4,000, 60 percent responded that they were still extremely interested.
- Of those extremely interested in the system, 50 percent said that they would prefer to pay over time; 71.4 percent of those that were only somewhat interested in the system were interested in paying over time. The availability of credit appeared to be important in marketing the system.
- Of those extremely interested in the system, all were married, and of those 90 percent had children at home. No singles or marrieds without children were extremely interested in the system.
- The primary age category extremely interested in the system was thirty-five to forty-four years old. Of the individuals in this age category, 20.83 percent said they were extremely interested in this system. The next interested age categories were the twenty-five to thirty-four and fifty-five to sixty-four age categories with a combined 15.4 percent.
- Educational levels did not differentiate interest in the system. Those with higher levels of education were slightly less likely to be interested.
- Of those who said that they had experienced foundation problems, 55.6 percent had all-brick homes. Again, these respondents were likely to have noticed exterior cracks. Respondents

with other types of homes may have experienced foundation problems but were unaware of them.
- Most of the homes with foundation problems (88.9 percent) had a market value of less than $85,000. More expensive homes may be constructed in such a way as to minimize foundation problems.
- Those likely to purchase the system usually made more purchases than planned compared to those not likely to purchase the system. Thus, the ten individuals who said they were extremely interested in the system may be acting on impulse and may not purchase the system when offered.

Interviews with ten home builders from the area provided insight into their interest in the system. Table C4.5 summarizes the results.

Financial Considerations

The stabilization system is estimated to cost an average of $3,650 per installation. A cost breakdown is shown in Table C4.6.

An engineering report, provided by a civil engineering firm on a fee-for-service basis, along with soil samples, determine the depth at which to install the system for maximum foundation stabilization. The average price per installation is expected to be about $4,500 yielding a 19 percent markup or a contribution-per-installation of $850. Since many consumers were expected to want to finance the system over at least five years, a local bank agreed to finance creditworthy home owners.

Although the addition of the stabilization system was seen as a complementary product to the repair business, Smith anticipated a substantial investment in materials, crew training, and equipment. In addition, the firm would need to locate additional capital as new areas were developed. Estimates of the initial investment needed for each market area are $150,000. This includes all the expenses of opening a new branch office; leasing office and storage space; hiring a general manager, sales staff, secretary, and work crews; equipment rentals; purchase of tools; and working capital of $25,000 per branch.

Since the firm was already in business in the Tulsa market, the initial investment was expected to be only about $50,000 for that market. However, since the concept of a stabilization system was new,

TABLE C4.5. Home Builders' Survey

Name	Home value	Comments
Mike Freeze Mike Freeze, Inc.	$65,000 to $85,000	Uses home owner's warranty (HOW) and does not see benefit of foundation stabilization system.
Larry Ogden Ogden Properties	$90,000 to $250,000	System is a good idea and he is interested in concept.
Dave Millsap Dave Millsap, Inc.	$150,000 to $400,000	Had a bad experience with the system on five different occasions. He indicates that system does not work and that it cannot be properly maintained.
Bill Hood Timberwood Custom Homes	$160,000 to $400,000	He is not interested in the system. He indicated that if foundation were put in properly you would not have problems. Get a soil test before building to determine soil type. He does not believe system works on some soils that do not need moisture.
William Howard Timbercrest	$55,000 to $90,000	He feels the same as previous respondent.
Perry Cox, President Cox Properties	$50,000 to $90,000	He feels the same as previous respondent.
Boyd Preston Prestige Homes	Over $120,000	He may be interested for higher priced homes of $250,000 or more.
Leonard Frye Frye Homes	Over $200,000	He may be interested if building in an area with unstable soil.
Jim Glenn Glenn Homes	$150,000 to $400,000	He thinks the system is a good idea and that this type of system is needed. He uses french drains on most homes.
Gary Smith Smith Homes, Inc.	$70,000 to $150,000	Every home is piered, which he believes will solve the problem.

TABLE C4.6. Cost per Installation

Item	Cost
Material	$1,800
Labor	$1,200
Engineering report	$200
Sales commissions	$450
Total cost	$3,650

promotion expenses were expected to run about $50,000 a year for the first three years of operation and at least $25,000 to $30,000 a year thereafter for all locations.

Additional crews could be added and equipment rented within a short period of time to allow for wide variations in demand for the system. In the Tulsa market, a 2 to 5 percent penetration would yield a substantial base from which to expand into other areas of the country.

The Smiths needed to calculate the expected returns they would make from an investment in the foundation system. In a proposed venture, the net inflows of cash expected from a project should be equal to or greater than the net profit after taxes plus depreciation. The analysis should terminate after ten years with zero salvage at that time, which would force the new company to stand alone with only the near-term cash flows determining operational feasibility. The company wanted the new venture to generate an internal rate of return of at least 15 percent if it were to be launched.