

STATE OF SOUTH DAKOTA CLASS SPECIFICATION

Class Title: Engineering Analyst

Class Code: 40856

A. Purpose:

Selects and applies engineering, economical, statistical and mathematical methodologies to evaluate and verify the accuracy and impact of engineering data, potential and proposed transportation projects, backlogged and accrued work, and designed projects to ensure the soundness of project development, the effective use of methods and materials and the timeliness of construction.

B. Distinguishing Feature:

Engineering Analysts evaluate and report on the feasibility, constructibility, and economy of transportation projects from concept through completion.

C. Functions:

(These are examples only; any one position may not include all of the listed examples nor do the listed examples include all functions which may be found in positions of this class.)

1. Analyzes transportation project actualities and develops and analyzes alternatives by selecting appropriate evaluative procedures to conduct analyses of data and determine costs and impacts.
 - a. Calculates the costs of backlogs and the impact and costs of accruals on available funds and timelines.
 - b. Conducts life cycle cost analyses for roads including initial and periodic costs, maintenance costs, cost of replacement, recycling and salvage costs, inflation and interest, and other pertinent components; and reports results for management decision-making.
 - c. Evaluates engineering components and costs in proposed projects for impact on project programming and funding.
 - d. Determines traffic level of service (LOS) for future highway corridors and individual transportation projects using professionally acceptable measurement techniques.
 - e. Retrieves data from department databases, verifies data accuracy and looks for and evaluates trends.
 - f. Develops planning studies for transportation project development showing backgrounds of the proposals, scenarios analyzed, assumptions, information broken down by options, effects, conclusions and summaries.
 - g. Decides whether to accomplish studies in-house or through consultants, reviews proposals and selects consultants, monitors work and authorizes contract payments.
2. Conducts analyses of transportation project plans to ensure correct engineering procedures have been applied in all aspects of the project, that applicable rules have been followed and that funding categories are correct.
 - a. Analyzes preliminary scoping documents, notes and sequences, reviews again following design changes and updates and refers changes and comments to designers.
 - b. Conducts final analyses of plans prior to bid letting to ensure compliance with engineering standards and applicable laws and rules, certification of impacted utilities has been achieved, rights of way have been cleared and funding is the most efficient and correct.

- c. Verifies engineering estimates, makes sure details are correct and following the proper order and makes sure process components are being paid for correctly.
 - d. Determines whether projects are being let at the optimum market time for construction components and changes letting dates based on market analyses.
 - e. Analyzes specific requests from contractors for alternative bid items to determine whether they meet department standards and approves or disapproves them.
 - f. Does preliminary analyses and justification on requests for atypical spending from funding categories and presents the requests for federal approval.
3. Organizes and directs value engineering procedures to find and eliminate unnecessary costs in projects.
- a. Evaluates high cost projects, those that may not be worth the money to build them, problem projects, etc.
 - b. Produces a team of objective analysts including planners, urban planners, city officials, designers, construction engineers and others.
 - c. Provides direction to the team in compiling and seeking information about the project to determine the project's functions, costs, and worth.
 - i. identifies high-cost elements and analyzes and assesses their cost/worth relationships;
 - ii. applies value engineering principles to the elements that have the greatest potential for value improvement.
 - d. Oversees the team as it works to develop possible solutions to the high-cost elements it has identified; and to select and justify the alternatives that best meet established criteria.
 - e. Prepares a formal value engineering report and presents the team's findings to managers.
4. Performs other work as assigned.

D. Reporting Relationships:

Reports to an Engineering Supervisor. Does not supervise.

E. Challenges and Problems:

Challenged to fulfill ambiguous requests for data-based reports on highway systems and activities throughout the state. This is difficult because the requests may come from the governor's office, managers, legislators, local government officials, individuals and others; requests may have few, if any, parameters so the analyst must determine the focus and extent of the request; the analyst must also determine the sources of data that will most likely provide the type of report needed; data sometimes has to be accumulated from several sources which are not always immediately available and requests often require quick response; reports are often used publicly so data validity must be verifiable; and it requires organizing and editing inscrutable data reports to make them clear and understandable. Further challenged to evaluate potential and designed projects for feasibility, constructibility, function and costs. This is difficult because it requires application of engineering, mathematical, economical, and statistical methodologies to a broad variety of elements; development of a plan of study that encompasses purpose, progress milestones, options, and participants; and validation and justification of the feasibility of all elements included in proposed alternatives.

F. Decision-making Authority:

Decisions include whether projects and studies will improve the operation of the state highway system; data and assumptions needed to complete an analysis or an engineering evaluation;

data resources and the content of final reports; final approval of plans for bid letting; whether the time is right with market conditions to let a project; final approval of costs used to produce engineers' estimates.

Decisions referred include release of data reports which may generate contention among affected entities; final approval of which projects will go through the value engineering process.

G. Contact with Others:

Weekly to monthly contact with coworkers to provide input on preliminary project scoping, to coordinate research and data exchange, and to work on project programming; and quarterly contact with department managers, and federal highway representatives to provide data reports.

H. Working Conditions:

Works in a typical office environment.

I. Knowledge, Skills, and Abilities:

Knowledge of:

- the principles and practices of civil engineering including transportation engineering, engineering economics and value engineering;
- analytical methods, survey design, statistical modeling, and data mining and optimization;
- life cycle cost analysis;
- highway construction.

Ability to:

- interpret and apply design guidelines;
- design a project study, establish the procedural protocol, and choose the statistical methodologies that are most applicable to the work at hand;
- establish working relationships among a team of diverse professionals and provide leadership by setting bench marks and timelines;
- communicate information clearly and concisely both orally and in writing.