

**Program Improvement Report
Bachelor of Science in Civil Engineering
2007-2008**

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Editor's Note: This document provides a summary of findings and actions resulting from implementation of the Civil Engineering *Program Improvement Plan (PIP)* in effect at the time of this report. The applicable *PIP* is described in the companion document:

Program Improvement Plan, B. S. in Civil Engineering, First Edition, August 2005.

Minor deviations from this *PIP* are summarized below. Since in any semester there may be slight changes to the metrics used for direct and embedded assessment in individual courses, these are not called out in the list.

Minor Modifications to the *PIP* Reflected in this *Program Improvement Report (PIR)*:

<u>Period</u>	<u>Modifications</u>
2005-2006	Use of new major-specific (CE) graduating senior exit survey instrument.
2005-2006	Addition of five supplemental questions to the college graduating senior exit survey instrument.
2006-2007	Additional modifications to the CE major-specific graduating senior exit survey instrument and the supplemental questions on the college graduating senior exit survey instrument.
2006-2007	Minimum acceptable pass rate for CIVL 311 Outcome (a) lowered from 90% to 80% for direct assessment.

The current edition of the *PIP* and all editions of the *PIR* are archived at:

http://www.ecst.csuchico.edu/depts/ce/Civil_Engineering/Program_Assessment.html

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* Reference: *Program Improvement Plan*, Bachelor of Science in Civil Engineering, First Edition, August 2005.

Introduction

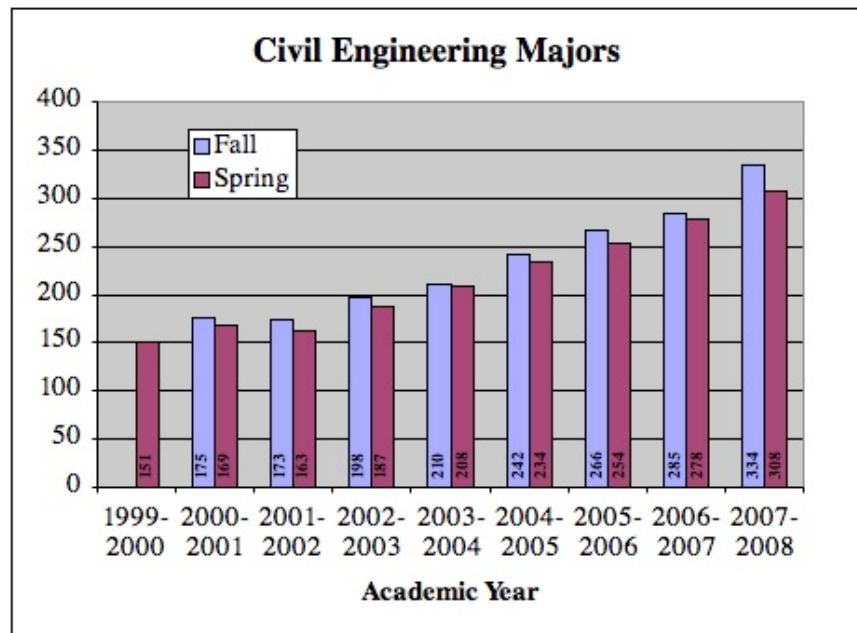
The various means and processes regularly used to assess the effectiveness of the Civil Engineering program and its students are fully described in the companion document, *Program Improvement Plan*, Bachelor of Science in Civil Engineering, First Edition, August 2005. Based on implementation of this *PIP*, this *Program Improvement Report* provides a summary of findings and actions during the 2007-2008 academic year.

Since certain assessment measures may not have been employed during the period addressed by this *PIR*, some sections may not contain any findings. Refer to the *PIP* to ascertain the status of any inactive assessment measure and the intended date when it will next be utilized.

The *PIR* presents only summaries and selected data deemed valuable to program assessment. The complete data sets are available in the Civil Engineering department office, in a binder entitled *Program and Student Assessment*. Sections that are shaded in the accompanying tables are from periods prior to the academic year addressed by this *PIR*. Although these data provide historical perspective, they are not the emphasis of this report.

Section I of this report, *Assessment Summaries and Observations*, presents findings and observations based on application of the *PIP*, but provides no suggestions for possible reactions to the findings. Possible reactions will instead be found in Section II *Actions Planned as a Result of Assessment*, where various actions are discussed, including a general reference to the assessment finding(s) that suggested the action. This reflects the complex synergy between assessment and improvement – for instance, a planned action may be in response to multiple assessment measures.

An important consideration when reviewing the most recent assessment findings is that the Civil Engineering program continues to grow at an unprecedented rate. This growth impacts many aspects of the program, including recruitment of an adequate number of instructional faculty and sufficient access to appropriate educational facilities.



I. Assessment Summaries and Observations

1. Direct and Embedded Assessment (PIP Sections I.1 through I.4)

The CE program’s direct and embedded assessment plan, which uses specific assignments in selected courses to measure students’ achievement of program learning outcomes, has been utilized in each semester since Spring 2004.

**TABLE I.1.1 DIRECT PROGRAM ASSESSMENT
STUDENTS DEMONSTRATING OUTCOME ACHIEVEMENT**

CE Program Learning Outcome	Course Used for Outcome Assessment	Prior Semesters							Current Semesters	
		S04	F04	S05	F05	S06	F06	S07	F07	S08
<i>The following assessment measure has a minimum acceptable achievement rate of 80%.</i>										
a: ability to apply knowledge of mathematics, science, and engineering	CIVL 311 Strength of Materials	76%	90%	76%	91%	85%	80%	83%	80%	71%
<i>The following assessment measures have a minimum acceptable achievement rate of 90%.</i>										
b: ability to design and conduct experiments, as well as to analyze and interpret data	CIVL 411 Soil Mechanics & Foundations	100%	-	97%	-	96%	-	100%	-	100%
	CIVL 415 Reinforced Concrete Design	-	30%	-	91%	-	95%	-	98%	-
	CIVL 441 Transportation Engineering	-	100%	-	97%	-	98%	-	100%	-
c: ability to design a system, component or process to meet desired needs	CIVL 415 Reinforced Concrete Design	-	100%	-	91%	-	90%	-	98%	-
	CIVL 431 Environmental Engineering	100%	-	98%	-	98%	-	100%	-	100%
d: ability to function on multi-disciplinary teams	CIVL 431 Environmental Engineering	97%	-	100%	-	100%	-	100%	-	100%
	CIVL 495 Lifelong Development for Engineers	100%	100%	98%	100%	100%	100%	100%	100%	100%
e: ability to identify, formulate, and solve engineering problems	CIVL 415 Reinforced Concrete Design	-	100%	-	94%	-	95%	-	98%	-
	CIVL 441 Transportation Engineering	-	100%	-	97%	-	98%	-	100%	-
f: understanding of professional and ethical responsibility	CIVL 402 Contracts, Specifications and Technical Reports	95%	100%	100%	95%	93%	87%	100%	100%	100%
	CIVL 495 Lifelong Development for Engineers	100%	100%	100%	94%	100%	100%	100%	97%	100%
g: ability to communicate effectively	CIVL 402 Contracts, Specifications and Technical Reports	100%	100%	100%	100%	96%	93%	100%	100%	100%
	CIVL 415 Reinforced Concrete Design	-	100%	-	100%	-	100%	-	98%	-
h: broad education necessary to understand impact of engineering solutions in a global and societal context	CIVL 441 Transportation Engineering	-	100%	-	97%	-	98%	-	100%	-
	CIVL 495 Lifelong Development for Engineers	100%	93%	100%	96%	100%	100%	100%	100%	100%
i: recognition of the need for, and an ability to, engage in lifelong learning	CIVL 495 Lifelong Development for Engineers	100%	100%	100%	96%	100%	100%	100%	100%	100%
j: knowledge of contemporary issues	CIVL 495 Lifelong Development for Engineers	100%	100%	100%	96%	100%	100%	100%	100%	100%
k: ability to use techniques, skills, and modern engineering tools for engineering practice	CIVL 131 Introduction to Civil Engineering Design	98%	-	98%	-	99%	-	93%	-	98%
	CIVL 415 Reinforced Concrete Design	-	90%	-	82%	-	95%	-	98%	-

Summary data from Fall 2007 and Spring 2008 are presented in Table I.1.1 as the percentage of students who successfully demonstrated achievement of the specified outcome in the designated course. Only certain courses are used for this assessment. Since some courses are taught only once each academic year, these courses will not display results in off-semesters.

Student achievement rates generally fall above minimally acceptable levels (80% for outcome “a”

and 90% for all other outcomes), indicating that the program is successfully providing students with the knowledge, skills, and attitudes targeted by the program. There was one exception, however: for outcome *a: ability to apply knowledge of mathematics, science, and engineering* as measured in CIVL 311 *Strength of Materials* during Spring 2008 student success was 71%. This assessment measure has proven to be unreliable and a new means for accessing this learning outcome will be developed for implementation beginning with the 2009-2010 assessment cycle.

As described in the *Program Improvement Plan*, every student who fails any outcome assessment is required to eventually demonstrate successful achievement of this outcome before he/she is allowed to continue progressing in the program, even if it means repeating the course in which that particular outcome is assessed. Consequently, all students in the CE program must successfully demonstrate achievement of all learning outcomes as well as successfully complete all required courses before achieving their degree.

Note: The program faculty is currently working to update the means by which the embedded program assessment is realized. It is anticipated that this will result in improved incorporation of learning outcomes, as specified by ABET, and enhancements and updates to the Program Improvement Plan. This will be the first comprehensive update since inception of the assessment plan in 2004. It is anticipated that the new plan will be implemented during the 2009-2010 assessment cycle.

2. Fundamentals of Engineering Examination (PIP Section I.5)

Question 13 on the Graduating Senior Exit Survey solicits from students their success on the Fundamentals of Engineering Examination.

The results in Table I.2.1 demonstrate that 90% or more of those surveyed who had also received test results passed the examination. This is not to claim that all students passed the exam in their first attempt or, since not all students had received their scores by the time the survey was distributed, even that they had all passed. Nevertheless, the results strongly suggest adequate student preparation in the fundamentals of civil engineering, a central mission of the program.

TABLE I.2.1 STUDENT PERFORMANCE ON THE F. E. EXAMINATION

Q13. Took a comprehensive exam

Year	No	Yes, and passed	Yes, and didn't pass	Yes, waiting for results	Total
02-03	0%	83%	0%	17%	100%
03-04	0%	55%	0%	45%	100%
04-05	0%	83%	0%	17%	100%
05-06	0%	65%	5%	30%	100%
06-07	13%	79%	0%	8%	100%
07-08	3%	76%	7%	14%	100%
	1	22	2	4	29

APPENDIX A: Graduating Senior Exit Survey

TABLE A.1 GENERAL RESPONSE DATA (CE MAJORS ONLY)

Q3. Came to Chico State as a

Year	First-time freshman	Transfer	Total
02-03	8%	92%	100%
03-04	45%	55%	100%
04-05	25%	75%	100%
05-06	35%	65%	100%
06-07	42%	58%	100%
07-08	31%	69%	100%
	9	20	29

Q4. Semesters attended Chico State

Year	1-3	4-6	7-9	10-12	13+	Total
02-03	0%	33%	17%	50%	0%	100%
03-04	0%	30%	30%	40%	0%	100%
04-05	0%	67%	8%	17%	8%	100%
05-06	0%	58%	5%	21%	16%	100%
06-07	0%	42%	25%	21%	13%	100%
07-08	7%	34%	34%	17%	7%	100%
	2	10	10	5	2	29

Q5. Overall GPA

Year	<2.25	2.25-2.49	2.50-2.74	2.75-2.99	3.00-3.24	3.25-3.50	3.51-3.74	3.75-4.00	Total
02-03	0%	0%	25%	42%	25%	8%	0%	0%	100%
03-04	0%	0%	15%	50%	20%	10%	5%	0%	100%
04-05	0%	0%	9%	45%	18%	18%	0%	9%	100%
05-06	5%	20%	15%	0%	15%	30%	10%	5%	100%
06-07	0%	4%	21%	17%	21%	13%	17%	8%	100%
07-08	7%	7%	14%	21%	24%	10%	7%	10%	100%
	2	2	4	6	7	3	2	3	29

Q6. Value of internship, co-op, or job if related to major

Year	Not exper'd	Not valuable	Somew't valuable	Valuable	Very valuable	Total
02-03	8%	0%	0%	25%	67%	100%
03-04	10%	0%	0%	40%	50%	100%
04-05	33%	0%	0%	0%	67%	100%
05-06	10%	0%	5%	30%	55%	100%
06-07	17%	0%	4%	25%	54%	100%
07-08	7%	0%	0%	29%	64%	100%
	2	0	0	8	18	28

Q7. Value of involvement in societies, activities, clubs

Year	Not exper'd	Not valuable	Somew't valuable	Valuable	Very valuable	Total
02-03	33%	8%	25%	17%	17%	100%
03-04	5%	0%	47%	21%	26%	100%
04-05	25%	0%	17%	25%	33%	100%
05-06	25%	0%	15%	25%	35%	100%
06-07	13%	0%	25%	33%	29%	100%
07-08	32%	11%	25%	21%	11%	100%
	9	3	7	6	3	28

Q8a. Plans after graduation: Attend grad school

Year	Yes	No	Total
02-03	38%	63%	100%
03-04	40%	60%	100%
04-05	27%	73%	100%
05-06	7%	93%	100%
06-07	14%	86%	100%
07-08	5%	95%	100%
	1	21	22

Q8b. Plans after graduation: Begin working

Semester	Yes	No	Total
02-03	92%	8%	100%
03-04	100%	0%	100%
04-05	100%	0%	100%
05-06	95%	5%	100%
06-07	91%	9%	100%
07-08	97%	3%	100%
	28	1	29

Q9. Number of job offers received

Year	None	1	2	3	4+	Total
02-03	60%	20%	10%	10%	0%	100%
03-04	11%	44%	39%	6%	0%	100%
04-05	0%	13%	38%	0%	50%	100%
05-06	11%	32%	26%	11%	21%	100%
06-07	5%	26%	32%	21%	16%	100%
07-08	0%	54%	29%	11%	7%	100%
	0	15	8	3	2	28

Q10a. Likely to accept current job offer

Year	Yes	No	Total
02-03	33%	67%	100%
03-04	67%	33%	100%
04-05	75%	25%	100%
05-06	72%	28%	100%
06-07	84%	16%	100%
07-08	86%	14%	100%
	24	4	28

Q10b. Current job offer: Starting salary

Year	<\$30K	\$30-40K	\$41-50K	\$51-60K	\$61-70K	\$71K+	Total
02-03	0%	33%	67%	0%	0%	0%	100%
03-04	7%	36%	36%	21%	0%	0%	100%
04-05	0%	0%	83%	17%	0%	0%	100%
05-06	0%	15%	62%	23%	0%	0%	100%
06-07	6%	6%	59%	29%	0%	0%	100%
07-08	0%	13%	33%	50%	4%	0%	100%
	0	3	8	12	1	0	24

Q11. Interview at career planning office helpful

Year	Didn't use	Not helpful	Somew't helpful	Helpful	Very helpful	Total
02-03	90%	0%	10%	0%	0%	100%
03-04	69%	31%	0%	0%	0%	100%
04-05	63%	13%	13%	13%	0%	100%
05-06	72%	0%	6%	11%	11%	100%
06-07	84%	0%	11%	0%	5%	100%
07-08	72%	0%	0%	14%	14%	100%
	21	0	0	4	4	29

Q12. How did you find your job?

Year	Career Planning	Faculty referral	On-line posting	Mailed resume	Personal connect	Other	Total
02-03	29%	14%	0%	29%	29%	0%	100%
03-04	0%	0%	29%	6%	24%	41%	100%
04-05	0%	13%	25%	38%	0%	25%	100%
05-06	13%	19%	0%	6%	31%	31%	100%
06-07	0%	6%	0%	12%	53%	29%	100%
07-08	8%	4%	20%	4%	40%	24%	100%
	2	1	5	1	10	6	25

Q13. Took a comprehensive exam

Year	No	Yes, and passed	Yes, and didn't pass	Yes, waiting for results	Total
02-03	0%	83%	0%	17%	100%
03-04	0%	55%	0%	45%	100%
04-05	0%	83%	0%	17%	100%
05-06	0%	65%	5%	30%	100%
06-07	13%	79%	0%	8%	100%
07-08	3%	76%	7%	14%	100%
	1	22	2	4	29

Q14a. Took a review course prior to exam

Year	Yes	No	Total
02-03	75%	25%	100%
03-04	63%	37%	100%
04-05	75%	25%	100%
05-06	58%	42%	100%
06-07	55%	45%	100%
07-08	48%	52%	100%
	14	15	29

Q14b. Value of the review course

Year	Not valuable	Somew't valuable	Valuable	Very valuable	Total
02-03	22%	22%	11%	44%	100%
03-04	8%	38%	31%	23%	100%
04-05	0%	44%	11%	44%	100%
05-06	8%	17%	58%	17%	100%
06-07	0%	25%	25%	50%	100%
07-08	14%	43%	43%	0%	100%
	2	6	6	0	14

TABLE A.2 SATISFACTION AND PROGRAM OUTCOMES (CE MAJORS ONLY)

Educational Satisfaction for CE	Spring 02	AY 02-03	AY 03-04	AY 04-05	AY 05-06	AY 06-07	AY 07-08	
Scale: 1=Very Dissatisfied; 5=Very Satisfied	Mean	Mean	Mean	Mean	Mean	Mean	Mean	N
Q15. Quality of teaching by faculty in department	4.08	4.12	3.95	4.00	4.16	3.67	3.89	28
Q16. Quality of teaching by other faculty	3.58	3.53	3.60	3.17	3.53	3.50	3.61	28
Q17. Access to faculty in your department	4.08	4.18	4.50	4.58	4.42	4.46	4.11	28
Q18. Availability of courses in your department	3.83	3.76	3.35	3.67	3.05	3.13	3.25	28
Q19. Quality of courses in your department	3.83	4.00	4.00	4.00	3.84	3.79	3.89	28
Q20. Access to lab facilities and equipment	4.00	3.94	3.20	3.83	3.79	3.96	3.43	28
Q21. Quality of laboratories and equipment	3.25	3.25	3.30	3.17	3.11	3.00	2.93	28
Q22. Access to computer facilities	3.33	3.12	4.20	3.50	3.79	3.17	2.96	28
Q23. Quality of computer facilities	3.00	2.71	3.60	2.75	2.27	2.46	2.61	28
Q24. Academic advising from your major advisor	3.83	3.71	3.30	3.50	3.79	4.00	3.29	28
Q25. Academic advising from Univ. Advising Office	3.33	3.18	2.89	2.64	2.78	3.38	2.62	26
Q26. Career information from your department	3.83	4.00	3.40	3.45	3.95	3.88	3.52	27
Q27. Availability of GE courses	3.75	3.71	3.95	3.55	3.56	3.71	3.89	28
Q28. Quality of GE courses	3.50	3.47	3.60	2.75	3.17	3.38	3.18	28
Q29. Overall quality of your education	4.42	4.35	4.20	4.50	3.95	4.04	3.93	28
Q30. Overall experience at Chico State	4.58	4.59	4.30	4.58	4.21	4.13	4.04	28

Program Outcome Trends for CE	Spring 02	AY 02-03	AY 03-04	AY 04-05	AY 05-06	AY 06-07	AY 07-08	
Scale: 1=Very Unprepared; 5=Very Prepared	Mean	Mean	Mean	Mean	Mean	Mean	Mean	N
Q31. Apply knowledge to solve problems	4.20	4.18	4.35	4.67	4.32	4.21	4.07	28
Q32. Design and conduct experiments	3.60	3.94	4.10	4.17	4.21	3.92	3.82	28
Q33. Analyze and interpret experimental data	3.93	4.12	4.40	4.33	4.32	4.17	4.14	28
Q34. Design component or system to meet needs	3.33	4.06	4.10	4.08	4.11	3.92	3.93	28
Q35. Function on multidisciplinary teams	4.33	4.12	4.45	4.75	4.47	4.54	4.18	28
Q36. Identify, formulate, solve technical problems	4.07	4.24	4.40	4.67	4.37	4.29	4.11	28
Q37. Communicate technical matters in writing	4.20	4.18	4.50	4.50	4.37	4.25	4.00	28
Q38. Communicate technical matters orally	4.07	4.00	4.30	4.08	4.21	4.08	4.00	28
Q39. Understand professional, ethical responsibilities	3.73	4.00	4.35	4.25	4.53	4.17	4.04	28
Q40. Understand contemporary issues facing society	3.53	3.76	3.90	3.58	4.37	4.04	3.61	28
Q41. Use modern tools and technology	3.80	4.12	3.95	4.25	4.05	3.58	4.07	28
Q42. Enter the workplace	4.33	4.12	4.25	4.50	4.53	4.08	4.07	28
Q43. Continue learning	4.33	4.35	4.50	4.67	4.42	4.04	4.14	28

Other	Spring 02	AY 02-03	AY 03-04	AY 04-05	AY 05-06	AY 06-07	AY 07-08	
Scale: 1=Strongly disagree; 5=Strongly agree	Mean	Mean	Mean	Mean	Mean	Mean	Mean	N
Q44. Recommend major program to others	4.07	4.19	4.35	4.92	3.89	4.00	4.04	28

Note: Current scores below 3.50 are highlighted.

TABLE A.3 ECC SUPPLEMENTAL QUESTIONS (CE MAJORS ONLY)

Responses to College Supplemental Questions (CE Only)

Satisfaction with department support while enrolled at Chico State

Year	Very Dis-satisfied	<----->	<----->	<----->	Very Satisfied	Total
07-08	19%	4%	27%	38%	12%	100%
	5	1	7	10	3	26

Frequency of meetings in University Advising office

Year	> Once a semester	Once a semester	Once a year	Occasion-ally	Never	Total
07-08	0%	8%	12%	27%	54%	100%
	0	2	3	7	14	26

Frequency of meetings with major academic advisor

Year	> Once a semester	Once a semester	Once a year	Occasion-ally	Never	Total
07-08	15%	42%	23%	15%	4%	100%
	4	11	6	4	1	26

How likely to enroll in an MSEM program after completing BS degree

Year	Highly	Possibly	Uncert'n	Unlikely	Definit'ly Not	Total
07-08	15%	12%	12%	38%	23%	100%
	4	3	3	10	6	26

If enter MSEM program, what format prefer for course work

Year	Weekday	Evening	On-Line	Televised	No Prefer.	Total
07-08	19%	42%	12%	0%	27%	100%
	5	11	3	0	7	26

TABLE A.4 CE-SPECIFIC SUPPLEMENTAL QUESTIONS (CE MAJORS ONLY)

Important Factors in Choosing CSU, Chico	AY 04-05	AY 05-06	AY 07-08	
Scale: 1=Not Important; 5=Very Important	Mean	Mean	Mean	N
Q6. Reasonable cost	3.91	3.88	4.12	26
Q7. Engineering program reputation	4.00	3.88	4.00	25
Q8. Geographical location	3.55	4.06	4.35	26

Topic Emphasis in CE Program	AY 04-05	AY 05-06	AY 07-08	
Scale: 1=Not Enough; 3=About Right; 5=Too Much	Mean	Mean	Mean	N
Q9. Water Resources (not asked AY 04-05 & 05-06)			2.46	26
Q10. Environmental	2.64	2.71	2.77	26
Q11. Geotechnical	2.55	2.71	2.73	26
Q12. Hydraulics	2.09	2.18	2.62	26
Q13. Structures	3.64	3.65	3.50	26
Q14. Surveying	3.27	2.82	3.19	26
Q15. Transportation	2.82	3.18	3.04	26

Results not available for AY 06-07.

Written Comments

What did you like best about the CE program?

The faculty, quality of teaching, well-rounded faculty and students.
 Surveying and other lower-division courses, upper-division coursework, practical lab experiences.
 Faculty with practical experience, use of hands-on activities and assignments in classes.
 Variety of CIVL elective courses.
 Breadth of the CE curriculum.
 Accessible faculty, availability of tutoring.

What things do you suggest to improve the CE program?

Less college politics and more focus on the students.
 Smaller classes, more encouragement for co-curricular activities (like student competitions).
 More use of practical design assignments, possibly in the community.
 More access to computers with useful civil engineering software, other than OCNL 334, including after-hours access.
 Maintenance of and enhancements to the physical laboratories.
 Hire more full-time faculty who care about teaching and can teach well.
 More quality classrooms.
 Better academic advising of CE majors.
 Make internships required.
 Better variety of CIVL elective courses and fewer cancelled electives.
 More assistance with employment opportunities.
 Stronger encouragement of students to take the FE.
 Offer required senior design courses both fall and spring semesters, not just one semester each year.