

AC 2007-2659: A TALE OF TWO CEE DEPARTMENTS: CIVIL ENGINEERING EDUCATION IN NEW ORLEANS POST-KATRINA

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A Tale of Two CEE Departments: Civil Engineering Education in New Orleans Post-Katrina

Introduction

New Orleans is one of the oldest cities in the United States. It was established in 1718 by the French near the mouth of the Mississippi River. The city is surrounded by water with Lake Pontchartrain to the north and cradled in a crescent section of the river to the south. Most of the city is built below sea level except for the oldest sections. Figure 1 consists of a map of New Orleans which shows the location of the two universities of interest, Tulane University and the University of New Orleans.



Figure 1: Map showing locations of Tulane and UNO

Tulane University is a private, nonsectarian, coeducational research university [1]. Founded as a public medical college in 1834, the school grew into a full university and eventually privatized under the endowments of Paul Tulane and Josephine Louise Newcomb in 1884 and 1886. Newcomb's endowment led to the establishment of H. Sophie Newcomb Memorial College within Tulane University. Newcomb was the first coordinated college for women in the United States. In 1894 the College of Technology was formed, the forerunner to the School of Engineering. In the same year the university moved to its present-day uptown campus on St. Charles Avenue, five miles by streetcar from its original downtown location.

Tulane is one of North America's top research universities; its status confirmed by it being one of 60 elected members of the Association of American Universities. Tulane also is designated as a Carnegie research university/very high research activity, the highest classification by the

Carnegie Foundation for the Advancement of Teaching. It is historically considered among the nation's prestigious and most selective institutions of higher learning. It is also considered by many to be among the group of schools termed the "Southern Ivies". Tulane is organized into 10 schools focused on liberal arts, sciences and the engineering, architecture and business professions. Undergraduate applications received annually more than doubled from 1998 to 2006, growing from 7,780 to a record 21,000 undergraduate applications. Application acceptances lowered from 79% of applicants in 1998 to 33% in 2006.

In July 2004, Tulane received two \$30 million donations to its endowment, the largest individual or combined gifts in the university's history. The donations came from Jim Clark, a member of the university's Board and founder of Netscape (incidentally Dr. Clark received his BS from UNO.), and David Filo, a graduate of its School of Engineering and co-founder of Yahoo!. The gifts had particular significance, since Tulane had had one of the lowest endowments (\$722 million as of June 2004) among the 62 members of the Association of American Universities. In the months following Hurricane Katrina, restrictions were removed from these gifts to ensure the continued financial health of the university.

The University of New Orleans, UNO, is a medium sized public urban university [2]. It is a member of the LSU System and the Urban 13. UNO was originally called Louisiana State University in New Orleans, LSUNO, and was legally established by Act 60 of the 1956 Louisiana Legislature. Greater New Orleans, with more than a fourth of the state's population, was without a public college or university until that time. When the United States Navy abandoned its air station on the south shore of Lake Pontchartrain in late 1957, the Orleans Levee Board leased it to the LSU Board of Supervisors for the site of UNO's campus. The inaugural convocation was held in a vacant aircraft hangar in 1958. This event marked the opening of the first racially integrated, public university in the South, with a total of 1,460 freshmen.

In September, 1969, when the enrollment exceeded 10,000, LSUNO became the second- largest university in Louisiana. By this time it had developed into a large academic complex embracing several colleges, schools, and institutes, offering graduate work in many different fields and awarding both the master's and the Ph.D. degree. In 1974, the LSU Board of Supervisors approved a name change, and LSUNO became the University of New Orleans.

By the fall of 1983, UNO had an enrollment exceeding 16,000 and had five senior colleges: Liberal Arts, Sciences, Education, Business Administration, and Engineering, in addition to its Junior Division and Graduate School. The University of New Orleans has grown to become a major urban research university. Categorized as an SREB Four-Year 2 institution, as a Carnegie Doctoral/Research University-Intensive, and as a COC/SACS Level VI institution, its students now enjoy a broad range of academic programs nearly one-quarter of which are at the master's or doctoral level.

Both universities have engineering programs. Tulane's School of Engineering has programs in civil, environmental, mechanical, chemical, biomedical, electrical, and computer engineering as well as computer science. UNO's College of Engineering has programs in civil, environmental, mechanical, and electrical engineering, computer science, a school of naval architecture and

marine engineering, and a masters program in engineering management. Both have Departments of Civil and Environmental Engineering, CEE, granting BS, MS and PhD degrees. The CEE departments are similar in size and specialty. The student population is very different. Tulane students are mostly from out of state (85-90%) and have very high SAT scores. Local students attending Tulane in engineering tend to be on academic scholarship or children of owners of local engineering firms. They are traditional college students, attending college immediately out of high school. Most Tulane engineering students graduate in 4 years; only a small percentage stay to work in Louisiana. UNO is known as a commuter school, with non-traditional working students who tend to be older. Most are from and live in the metro New Orleans area and most stay in the area upon graduation.

Table 1: A comparison of Tulane University and the University of New Orleans

Item compared	Tulane	UNO
Date established	1834	1958
Type	Private	Public
# students (PreKatrina)	12,910	17,250
Tuition	\$31,900	\$3,292
Engr Depts	CEE, ME, EE, BioMed, CHEM	CEE, ME, EE, NAME
Date CEE Dept established	1894	1974
Date CEE ABET accredited	1936	1980
# faculty (PreKatrina)	8 w/ 3 open	9 w/ 2 open
# CEE undergrads/grads	105/35	250/40
% out-of-state undergrad	75% total/85%CEE	Less than 5%

Impact of Hurricane Katrina on Tulane and UNO

The effect of Hurricane Katrina on New Orleans was catastrophic and long-lasting. The storm was the costliest hurricane and one of the deadliest natural disasters in U.S. history. By August 31, 2005, eighty percent of the city was flooded, with some parts under 20 feet of water. The flooding was caused by overtopping of and breaches to the levees and flood walls protecting New Orleans and the surrounding communities of St. Bernard and Plaquemines Parishes. Figure 2 shows the location of the breaches to the protection system. The Mississippi River Gulf Outlet ("MR-GO") breached its levees in approximately 20 places, flooding much of New Orleans East, most of Saint Bernard Parish and the east bank of Plaquemines Parish. The major hurricane protection system failures in the city included breaches at the 17th Street Canal floodwall, the London Avenue Canal floodwall, the Duncan Canal floodwall and Industrial Canal. Flooding from the breaches put the majority of the city under water for three to six weeks, as shown in Figure 3.

Tulane University, located near the river on high ground, had flooding on its northern edge (see Figure 3). Fortunately, no academic buildings are located on the northside of campus. The married student dorm and the baseball field suffered flood damage. There was relatively little damage due to wind and wind-driven rain. The neighborhood surrounding the university was largely left intact, with flooding of the residential section to the north of South Claiborne Ave (the street that runs on the university's north boundary). Tulane did shut down the Friday prior to the hurricane according to its hurricane plan [4]. As reported in the Times Picayune, Tulane's

damages were approximately \$200 million, primarily in loss of revenue. Tulane set up offices at the University of Houston, in Texas, and did not have a Fall 2005 semester. Tulane students were taken in by many universities; most did not charge the student or Tulane for tuition for that fall.

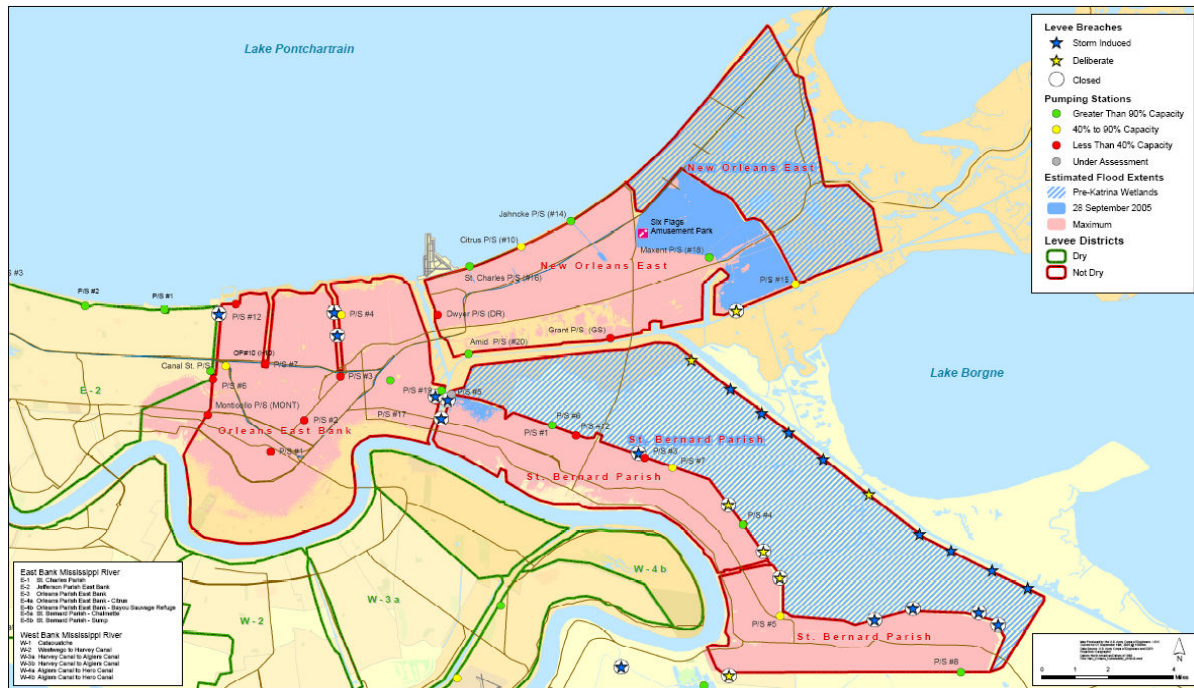


Figure 2: Hurricane protection system and location of breaches [3]

The University of New Orleans, located for the most part on high ground on the edge of the lake, suffered several feet of flooding on the southern part of its campus (see Figure 4). This section is the lowest in elevation and also is located two blocks away from one of the breaches of the London Canal floodwall. The engineering building, married student housing, Bienville Residence Hall, The Cove, the chemistry building, and the science/geology building were flooded for three-four weeks. UNO, sitting right on Lake Pontchartrain, was buffeted by very high winds and wind gusts, especially the buildings in the Technology Park. Many university buildings were damaged by the wind, with broken windows and cladding damage allowing rain into the interior of most buildings. The neighborhoods surrounding UNO suffered serious longterm flooding (the neighborhoods of Lakeview, Gentilly, and Pontchartrain Park). A substantial amount of damage was due to the use of the university by the National Guard and by neighbors as an unintended shelter. The National Guard dropped off over 2300 rescued people and many others walked, swam or boated to the only high ground for miles (UNO). These evacuees stayed for about a week before being airlifted out of the area with no leadership or civil organization, electricity, water, sewer, or food (National Guard did drop water and MREs after a

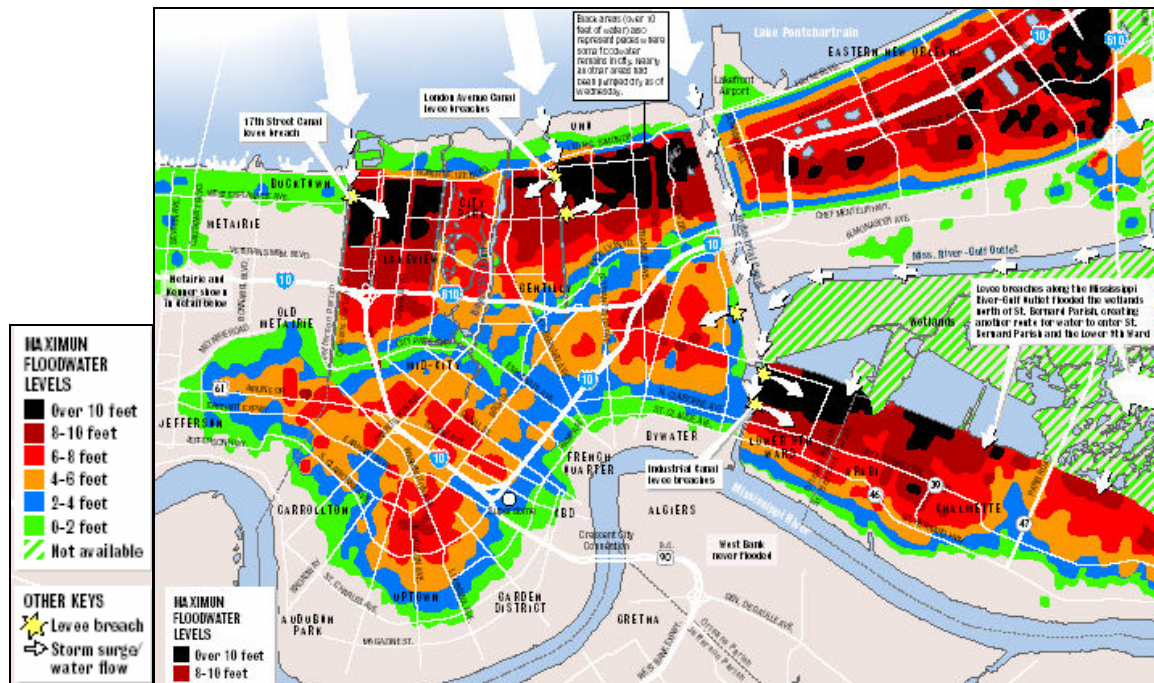


Figure 3: Level of flooding in New Orleans Area [5]

couple of days). UNO has since modified its hurricane plan [6]. It is estimated that damage to the campus due to flooding, wind, rain and evacuees is over \$100 million, with loss of revenue during the Fall 2005 semester at another \$50 million. UNO set up an office at LSU in Baton Rouge and initially urged all students to register and attend classes wherever they had evacuated. By October 10th, 2005, UNO held a Fall 2005 semester at several remote sites (a satellite campus in next door Jefferson Parish, 3 area high schools and an area middle school), as well as online. Over seven thousand of the original 17,250 students attended the Fall 2005 belated, abbreviated semester. UNO was the only impacted university or college to “open”, be it off-the-main-campus, for fall 2005. At that time, access to the main campus was limited to upper administration and facility services, operating in temporary offices in the Education Building as their offices had rain damage or had flooded.

Renewal/recovery plans

Both universities’ upper administration realized that proper planning was necessary to minimize the serious impact of Katrina. However, the process used by each university to develop the recovery plans drastically differed.

Tulane University’s President, S. Cowen, and Provost, L. Lefton, drew up a renewal plan and declared financial exigency on December 8, 2005, after reviewing the plan with the Board of Trustees. The Plan for Renewal was adopted in response to major Katrina-related damage and severe budget shortfalls for the 2005-2006 year. Deans were notified of the decision in the morning and department chairs of eliminated departments were called at noon. A public announcement was made late that afternoon. As a result of the rapidity of the plan’s adoption, many affected faculty members heard about their fate on the evening news or by visiting the university website. Tulane incurred more than \$200 million in property, operating, research and

collection losses. The renewal plan, which included widespread faculty and staff layoffs, sought to reduce Tulane's annual expenses by some \$60 million. Michael T. Strecker, Director of Public Relations at Tulane University, reported that because of Katrina, Tulane had to separate 429 full-time staff members and 166 full-time faculty members (61 were tenured) from the University. No further separations are anticipated. The renewal plan called for the suspension of 14 doctoral programs and the elimination of three engineering departments (that administered five ABET accredited undergraduate degree programs and numerous graduate degree programs) and the exercise and sports science department. The School Of Engineering is no longer a separate school. The plan also included the suspension of eight sports and merged the Tulane College (for men) and the H. Sophie Newcomb College (for women) into the Newcomb Tulane College for all undergraduates. The School of Medicine was hardest hit, losing an estimated 35% of its faculty, primarily clinical professors that lost their patient base. Tulane has suffered some initial enrollment losses as well. In 2004, fall enrollment was 13,214. There was no fall enrollment in 2005 because of Katrina. Spring enrollment was 11,307.

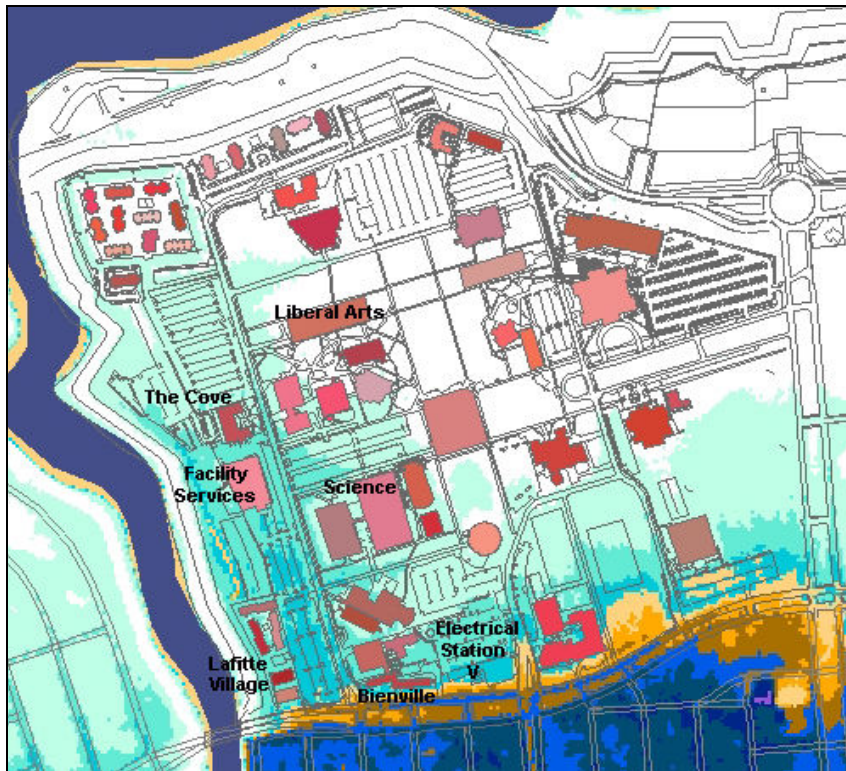


Figure 4: Flooding of UNO campus (darker colors indicate deeper flood) [7]

The University of New Orleans lost about \$50 million in revenue due to Hurricane Katrina and had over \$100 million in damages. Just before Katrina, enrollment was 17,250 for fall 2005. This dropped to 7,000 after Katrina. In the spring of 2006, 11,600 students were enrolled. Fall 2006 and Spring 2007 enrollment have been substantially below initial projections and below Spring 2006's numbers. Many potential freshman and sophomores have either not yet returned to the city or, many locals suggest, they are postponing college because of the vast amount of well paying rebuilding jobs that can now be had that do not require a college degree. Besides UNO's loss of tuition revenue, the state also cut UNO's budget by \$6.5 million. In mid-October of 2005, all UNO deans were asked by Chancellor T. Ryan to begin work on a plan for restructuring. In

May of 2006, UNO declared financial exigency with approval of the LSU Board of Supervisors of the plan that was developed by upper administration and the deans of all colleges. At the supervisors' meeting in June of 2006, the board passed the UNO administration's recommendation. According the minutes of the meeting, "The proposal is that UNO will eliminate several departments and degree programs in the area of Human Performance and Health Promotion, Engineering Management, Economics, and Communications. The College of Urban and Public Affairs will be eliminated and replaced by the new School of Urban and Regional Studies, which will house a new department of planning, as well as the existing departments of anthropology and geography." The Engineering Management Department was shuttered but the degree program remains, jointly administered by the Colleges of Engineering and Business. The College of Urban and Public Affairs was eliminated as an administrative unit. However, no degree programs were eliminated. Instead, those degree programs will continue to be offered through the new Department of Planning and the School of Urban and Regional Studies. The School of Urban and Regional Studies now includes departments of anthropology, geography and planning. It is now housed in the College of Liberal Arts. Likewise, while the degree programs in economics were eliminated, the Department of Economics and Finance was not eliminated, and economic courses are still being taught. A total of 83 of the approximately 500 faculty line positions were eliminated, mostly through voluntary retirement or faculty leaving. Of these 83, 16 were furloughed against their will. Of the 16 furloughed against their will, nine (seven tenured and two untenured) did not appeal. All seven who are appealing the furlough notices are tenured faculty.

Was Tulane's renewal plan developed in a systematic and objective manner?

After the nation's biggest natural disaster devastated New Orleans, the need for engineers became very acute in the Gulf Coast region. At a time when engineering graduates are needed in recovery efforts, it's ironic that Tulane administration felt that elimination of these key departments was necessary. This decision shocked the nation's engineering community since it made no sense coming at the heels of one of the most significant rebuilding efforts ever faced by any region. It can be assumed that many factors may have been considered by upper administration in the development of the renewal plan. Financial considerations were likely, as well as national and international academic and research prominence and numbers of students in each program. While Tulane had some hard decisions to make in order to ensure its continued financial health, the targeted elimination of key engineering programs to address the declared financial exigency is surprising. It is puzzling that it retained engineering programs – biomedical and chemical engineering – that had a combined deficit greater than that of the eliminated programs. At least one of the eliminated departments operated consistently at a substantial surplus. Obviously, financial considerations alone weren't the drivers of this decision. What makes the decision even more bothersome is the decision of the university to give all faculty a 3 percent raise soon after making the cuts. Most faculty would have been willing to go an year without a raise if the impact on academic units could be minimized. On the subject of national prominence, the numerous programs in the School of Arts and Sciences were untouched though many are less critical than engineering to the maintenance of the reputation of the university and particularly are not relevant to the needs of the state and region at a time of crisis. The student population in the eliminated programs is small, but most programs at Tulane feature small and intimate size. The administration never explained why the axe fell so selectively on engineering

programs. It appears that the elimination of the key engineering programs was a strategic decision that the administration made much earlier; Katrina just provided an opportunity to implement it.

What could have been done differently at Tulane?

Tulane administration made the decision to eliminate the targeted engineering programs without consulting the impacted units and exploring mechanisms for sustaining the programs by the elimination of the forecasted deficits through changes made within each academic unit. Had the department chairs of the eliminated engineering programs been given an opportunity to address the situation, they would have shown guaranteed ways of eliminating the deficits by a combination of measures: freezing open positions, redirection of existing endowment funds/income, salary reduction, significant pledges from alumni, redirection of focus of programs, etc. There was no question that the alumni base could have been galvanized to help generate the resources needed to keep the departments running for another 100+ years. The departments have a tremendous amount of goodwill among their successful alumni who have in the past been more than willing to step up to the plate when needed. If the departments had only been given a couple of weeks to develop their own renewal plan, their elimination could have been avoided.

Lack of national standards for financial exigency

The financial exigency declared by Tulane University and used to restructure the university couldn't be challenged since there is no available mechanism to do so. Unlike state supported universities whose budgets are open for public review, a private university budget is closed to public inspection. Financial exigency is understandable for the clinical medical portion of the university due the depopulation of the city (its patient base) and the devastation of the teaching hospital and medical clinics. These facilities were not located on the relatively unscathed main campus, but in an area of the city that sustained over three weeks of flooding and significant wind damage. Engineering is located on the main campus and did not suffer flooding damage. It's hard for the eliminated engineering faculty to appreciate financial exigency when raises are forthcoming from a university that claims it's facing a financial crisis. UNO, as a public university and a member of the LSU system, had detailed procedures to follow in order to declare exigency. The procedures required permission by the LSU Board of Supervisors at a public hearing for the declaration once the need for the declaration was proven. Should national standards for the declaration of financial exigency be developed and implemented across all universities that require an independent external review of the situation, particularly when the careers of tenured faculty are involved?

Role of national professional societies

After Tulane announced its renewal and restructuring plan, professional societies were indifferent to the situation. None of the national engineering societies – ASCE, ASME, ASEE, IEEE, NSPE - nor Louisiana's State Board of Registration for Engineers and Land Surveyors expressed alarm at the decision. After Tulane eliminated civil engineering, the New Orleans Branch of ASCE wrote a letter of support to UNO's Chancellor expressing concern that a

subsequent elimination of civil engineering at UNO would leave the entire region with no a civil engineering program at all. Should engineering societies be proactive and call to question the decisions of university administrators? The only national organization that took a serious look at this issue was the AAUP due to its concern about faculty rights, the strategic planning process that didn't engage the faculty and the need for substantiating the existence of financial exigency when most of the losses may be covered by property insurance, FEMA and work interruption insurance. AAUP's efforts, though laudable, have had little impact on the overall outcome.

American Association of University Professors (AAUP) Review

AAUP, as a watch dog for university faculty, sent a team of experts into the New Orleans area in 2006 in order to evaluate the process used by each New Orleans university in eliminating tenured faculty. The report of this team is not yet finalized.

Regarding faculty layoffs at Tulane, Director of Public Relations Strecker stated, "The cuts that were made were done strategically and within the context of the Renewal Plan. The separation of faculty and other employees from Tulane University was a painful and difficult decision but was necessary in order to ensure the academic and financial survival of Tulane after Katrina. The separations were made in adherence to our Faculty Handbook, which was approved by Tulane's faculty. To the extent that AAUP guidelines were incorporated in the Handbook, they were followed." Yet critics of Tulane's renewal plan can argue that the plan lacked meaningful faculty input prior to implementation and that the guidelines for faculty termination were vague or nonexistent and the timetables for separation varied greatly. Many critics question whether department politics, age or other discrimination agendas played a part in faculty layoffs and whether such severe layoffs are now needed in light of the University's present financial picture. The university has not made public any actions taken by eliminated tenured faculty.

Provost of the University of New Orleans, F. Barton says "AAUP is doing its job to come in and make sure things were done in a proper way...UNO followed very carefully the bylaws and procedures that were laid out by the LSU system. Tenure as an idea is absolutely not under attack. Once the financial exigency is lifted, then tenure protections will return. If it weren't because of financial exigency, we would never have found ourselves in a position of having to give furlough notices. Nobody wants to do it... and nobody wants to ever do it again."

Impact on Tulane and UNO Civil and Environmental Engineering Departments

Almost all of the students in civil engineering at Tulane returned to Tulane in the spring of 2006, despite the fact that the department will be shuttered in May of 2007. All classrooms and labs were fully operational and undamaged by the storm. All faculty have contracts that terminate in May of 2007, when a 113 year old civil engineering department will close its doors for good.

Eighty percent of UNO's civil engineering undergraduate students and forty percent of the graduate students returned to UNO CEE in the belated Fall of 2005, even though it was highly likely that they were personally impact by the storm. Most CEE courses were taught either online or at one of the five temporary satellite locations. Instructors could not access their offices on the main campus and had to make due in many cases without course notes or texts. By February of

2006, mold remediators gave UNO engineering the OK to go into the nine story building that had flooded. But students could not enter the building, nor was the building given the “OK to reoccupy” by administration until late May of 2006. Flood waters and rain from the wind-damaged roof had rendered all six elevators, HVAC, auxiliary plumbing pumps (no water pressure above the second floor), and sprinkler system pumps inoperational. Faculty and staff could enter at their own risk (walk eight flights of stairs up to the CEE offices). Most of the CEE labs were located on the first floor and were also and still are inoperational. CEE courses were taught in the Liberal Arts Building in borrowed classes. The ABET visit was postponed one year to the fall of 2007. In addition, most of the students who did not return to UNO were in the freshman and sophomore class. The department anticipates that it will be several years before student numbers return to pre-Katrina levels, despite the extraordinary demand for civil engineers in the rebuilding of the area. Two vacant (due to retirement) faculty line-item positions were eliminated in the CEE Department. It is unknown when these positions will, if ever, be recovered. On a positive note, all engineering programs are now designated “Programs of Excellence” per UNO’s Strategic Plan. This designation puts funding emphasis on all engineering programs (prior to Katrina, only the NAME Department was a Program of Excellence).

Conclusions

Why was the outcome for two CEE departments so different? No one can argue that there is great need for civil engineering expertise in the rebuilding of New Orleans. What could Tulane’s upper administration have done differently? The administration did not consult any chair of the eliminated engineering departments nor the engineering advisory board in the strategic planning process. There was no opportunity for the departments and the alumni serving on the advisory boards to offer alternative solutions. It’s a shame that 110+ year engineering programs that have produced a multitude of outstanding engineering leaders who have made significant contributions to the city of New Orleans, state of Louisiana, and the nation have been so summarily dropped with little or no input from the constituents. There was absolutely no need for these programs to be eliminated; these programs have enough alumni who are resourceful, successful, and willing to step up to the plate to save their home departments. They were never given a chance. Tulane’s actions give rise to serious questions about the status of engineering education and the engineering profession in the country. Being valued less than peripheral arts programs by the administration at a major university should be a clarion call to engineering educators. Academic leaders who have little or no understanding of the significance of engineering in the society are administering us. Tulane’s President, S. Cowen, comes from business; Tulane’s Provost (during the crisis), L. Lefton, from psychology; UNO’s Chancellor T. Ryan is an economist; and UNO’s Provost, F. Barton, from English. A senior administrator’s remark demonstrates a non-engineer’s ignorance of engineering: “What has Tulane got to do with welding and carpentry?” It’s evident that university administrators, particularly at private universities, tend to view engineering as a costly undertaking. Engineering students tend to be the brightest and also the ones with the most need for financial aid among all applicants. Engineering faculty need expensive lab space and equipment and young hires need large start-up packages. The actions of Tulane in not honoring tenure, eliminating programs without proper consultation, declaring financial exigency while affording raises, set a precedent that other universities can easily embrace. There lies a greater danger!

“It was the best of times, it was the worst of times...” That depends on your point of view: civil engineers were in part responsible for this disaster, civil engineers will be responsible for the rebuilding, but a 113 year old civil engineering department, in the middle of what has been described as a vast living laboratory, is a casualty of the storm.

References

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