

## 2011 IRF InARoad Awards

**Program Description: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

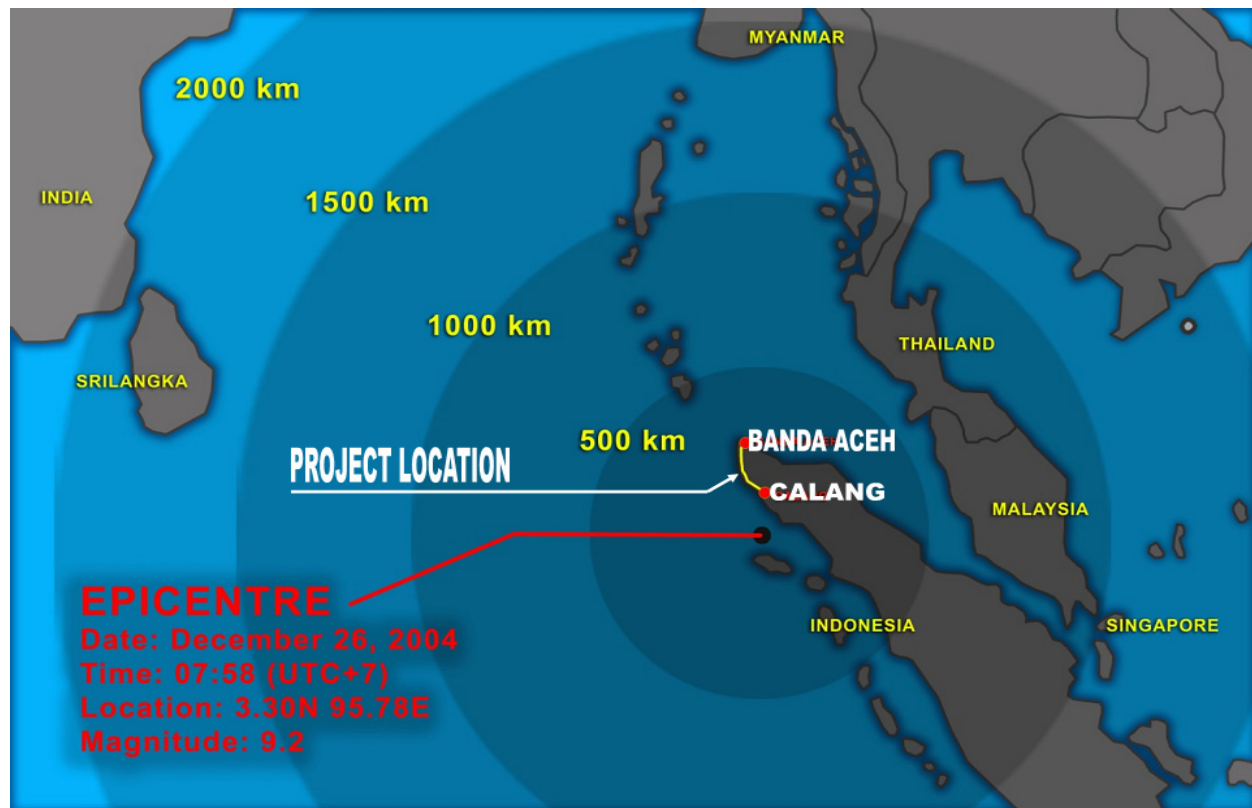
**Submitting Organization: United States Agency for International Development (USAID)**

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### Program Description

#### Introduction

The magnitude 9.2 earthquake, largest on the planet in 40 years, that struck in December of 2004 some 150 kilometers off the western coast of Sumatra, Indonesia triggered a series of tsunamis as high as 30 meters that left Aceh Province, Indonesia reeling with tragedy, immense loss of lives and overwhelming uncertainty of what the future held for any survivors of this epic event. Condolences and assistance began pouring in from all over the world.



Immediately following the tsunami, aid organizations focused on short-term needs to reduce suffering. This is understandable and no doubt reducing people's immediate suffering is the first priority. The U.S. Government, through the United States Agency for International Development (USAID), as others, provided emergency relief but at the same time carefully considered what might be of a greater and more lasting value to fulfill their goal for best assisting local people in this devastated region to rebuild their lives.



*Remnants of the original Aceh Road in a tranquil setting near the Aceh coastline.*

The assessment was quick to conclude that the key to restoring the economic and social fabric of Aceh Province required the construction of a new road through the tsunami damaged coastal area. That project, which became the signature project for USAID, initially was envisioned to involve the construction of a 240 kilometer long, 4-lane divided national highway designed to international standards to connect Aceh's provincial capital of Banda Aceh to west Aceh's major economic hub of Meulaboh, where one third of the city's 120,000 people lost their lives. Also anticipated was the construction of more than 110 bridges and crossings, all of which were damaged or destroyed.

The vision was a great one. However, further study revealed that the envisioned 4-lane highway did not suit the conditions, exceeded the local needs and surpassed the available funding. That the initial concept was overly ambitious was understandable and perhaps expected. The destruction of the tsunami was so indiscriminating and wide spread that almost nothing in its path was spared. This included local services and the vast majority of the technical expertise in the region. With a scarcity of local expertise, limited reliable data and an urgency to bring immediate relief to the suffering local community, organizations were driven into committing to almost spontaneous plans without sufficient time to conduct thorough assessments. This was particularly the case in Aceh since aerial photography, which would normally be a basis of a reconstruction plan, was unreliable because of the tsunami's devastation. Coastlines disappeared under the ocean while flatlands became swamps. Relief and reconstruction planning was consequently relegated to assumptions of how the coastline and terrain would evolve. The need for fast response required some visual evaluation to be done by air and some by boat in the area that retained local flooding.



*Remaining battered bridge abutments on the Aceh coast are a brash reminder*

At the same time, the thought of such large amounts of funds for a single program was enticing to local government officials. As such, the first challenge was to parry down the project scope to workable limits within the available funding. During the chaotic early days of the design phase, input was solicited from the Provincial Government and, in some cases, from the local communities with the intent of finding the optimal route for the new road. It quickly became apparent that these requests tended to stifle rather than facilitate the decision process as it was

impossible to develop an alignment that pleased all parties without compromising the design standards. Idealistic alternate preferred routes nominated by individuals in the local government were also eliminated in order to provide a constructive program that was realistic and within limits of the emergency funds made available by the U.S. Government. The scope of the project was ultimately consolidated into 146 km of new and rehabilitated road that connects Banda Aceh, the provincial seat, with Calang, the capital of the Aceh Jaya District. Also included were 27 steel truss and concrete bridges and 272 drainage culverts.

### **Project Initiation**

While the scope of the project was being derived and with considerable community pressure to demonstrate timely and responsive action, a token work package was awarded to an Indonesian contractor to clean up debris from the tsunami, maintain temporary roads and provide some initial simple design work. However, without an agreed alignment for the permanent facility, the Indonesian Government did not initiate a program to obtain land access in the first year of the project.

Designing the new two-lane road had to take into account Aceh's unique blend of rainforest, coastal swamplands and steep granite and limestone hills. The alignment's design also had to comprise segments of new road to replace roads that had disappeared where the coastline was reshaped, and link these with segments of pre-existing road that needed to be rehabilitated and often widened. Ultimately, the road and bridge design standards emerged as a combination of both American Association of State Highway and Transportation Officials (AASHTO) and Association of Southeast Asian Nations (ASEAN) standards.



*To avoid running along the sandy shoreline, the corridor of the new Aceh Road was blasted through the low point between adjacent limestone and granite hills. A photo of the finished 65m high cut is included in the Summary / Conclusion.*

At a critical early stage, USAID made an important decision to focus on the quality, safety and durability of the new road at the expense of quick completion. USAID could have elected to simply reconstruct the pre-tsunami road, which in general would have involved overlaying and following the alignment of the 6m wide, two lane road along vulnerable coastal areas.

Instead, USAID elected to provide an 11m wide road that included 2m paved shoulders. Wherever feasible, meandering existing alignments were straightened to provide a more direct and safer route. The road was also aligned inland from the coast and on higher ground to improve its durability.

Positioning the new road over this terrain is costlier and more time consuming to construct than finding a less direct route that follows the alignment of the pre-tsunami road. However, it has resulted in a significantly better facility.

To construct the straighter alignment, a corridor was blasted through the coastal hills. Using the excavated material, the deep nearby valleys were filled to produce a rolling but comfortable drive that provides spectacular panoramic views of Aceh's picturesque Indian Ocean coastline. This has resulted in cuts of up to 65m in height and, similarly, fills of up to 35m to balance the earthwork as much as possible. Through the swamps, geotextile fabric was placed to strengthen the road's foundation and to ensure any remaining settlement would be minimal and uniform.



*Use of large cuts and high fills to construct the new road in its most direct alignment enables faster travel using less fuel and with less wear and tear on vehicles, which results in a greater boost to the economy with a smaller impact on the environment.*



*Before / After of construction of new corridor through swamps to provide a more direct and safer alignment. Geotextile was employed to minimize differential settlement.*

In addition to significantly reducing travel time between Banda Aceh and Calang, the new Aceh Road is also much more dependable during inclement weather. With the new bridges and culverts and a firm riding surface, the new road is expected to remain operational through Aceh's habitual flash floods. The embankment slopes have been landscaped to make them durable and attractive while the coastline slopes are armored to prevent damage from storm surges. These are just a few of the features to ensure the Aceh Road will serve the public long into the future.



*Embankment slopes along the coastline are armored to endure storm surges.*

To temporarily restore ground transportation along Aceh's west coast prior to the construction of the new road, the Indonesian

military constructed an emergency route shortly after the tsunami. Traveling on the temporary route was rugged as vehicles had to navigate unpaved gravel and muddy potholed roads, one-lane temporary bridges, and improvised ferries comprised of wooden planks fastened to two or three small fiberglass hulls that were powered by a small outboard motor. Since there were no viable alternative routes, it was not uncommon for the queues at the ferries or for crossing the temporary bridges to back up for hours. On wet days when the emergency road had become muddy or even briefly impassible or when the temporary ferries had closed due to fast flowing water or for maintenance, the trip on the emergency road extended from hours to even days longer.

USAID was sensitive to the plight of the region and the immediate need for a paved road. To expedite construction of the most critical aspects of the highly traveled areas immediately south of Banda Aceh while the design of the remainder of the permanent facility was being prepared, USAID elected to break the work into multiple construction contracts. The first, which was appropriately named the Priority Contract, consisted of the construction of 17 kilometers of new road but was soon expanded to consist of construction of 41 kilometers of mainly new road and 14 new bridges that were considered to be critical to immediate recovery.



*To prevent erosion, topsoil and sod have been installed on all embankment slopes.*



*Simple ferries run by the locals were used to provide temporary crossings of large waterways.*



*The emergency road constructed by the Indonesian military immediately after the tsunami was a source of dust on the villages during the dry season and was muddy and often impassible during the rainy season.*

**Land Acquisition and Community Issues**

Although negotiations for the Priority Contract were completed in September of 2006, access to any permanent project right of way had still not been obtained. To the disappointment of all involved, this necessitated that the fabrication of two bridges be put on hold as there was no

place to put any completed material. In mid September the local government hosted a special ceremony to kick off the construction program with the promise that 40 kilometers of right of way was being purchased. In the spirit of partnership, USAID released one bridge for fabrication with the understanding that the right of way was being purchased at this location. Following the ceremony, it was learned that instead of 40 kilometers of right of way, only four parcels of land had been purchased and none of them connected.



*Local traditions were observed at the ceremony to kick off the construction program in September 2006.*

This created an embarrassing and frustrating situation that prompted USAID to organize a committee to focus on the procurement of specific locations for right of way that would allow the work to go forward. With this effort, the first stretch of land that could be constructively used was acquired in the amount of 200 linear meters. Since this land was at the river's edge for the bridge which was in fabrication and since there was a public gravel road along the side of the river that provided access, the bridge was released for construction and authorization to proceed with work was provided in October, 2006. Although it was a small start, it was a

springboard for the development of a successful project stretching the entire 146 kilometers.

Almost immediately thereafter, the local community expressed concern about a number of graves that existed immediately in front of the location of the first bridge that local legend says were guarded by a mystical white tiger. This again put an immediate roadblock into the construction program as the community demanded that the bridge be relocated. Considering this was the very first construction effort and only a limited 200 meters was involved, USAID determined that it would not be wise to move the structure and possibly open the project to unending alignment shifts throughout the duration of the work. To keep the project on track, USAID made a second major decision to freeze the alignment that was impartially established in accordance with the project requirements and constraints. This brought an abrupt end to the route selection phase and allowed the project to move aggressively ahead.



*Construction began adjacent to a river in the Aceh jungle in October 2006.*

The sensitive religious and traditional issue of the conflict with the graves was directed to the local government leaders for resolution with the thought that if the issue could not be resolved

the alignment would be shifted, then the project would be in jeopardy of severe schedule slippage. Indeed, it is not uncommon in Indonesia that the duration of road construction on new alignments exceeds a decade while land access issues are resolved and the required land is acquired. Although it took two months, the local government leaders resolved the sensitive issue of relocating the 49 graves by including traditional ceremonies and the physical relocation of the bodies. Thus, the work was able to move forward as originally planned and the precedence established preempted frequent additional unnecessary and cumbersome alignment changes all along the route. This process proved successful along the alignment and was used in relocating more than 600 graves that were discovered during the clearing and grubbing activities.

The initial acquisition was the beginning of what was an almost insurmountable challenge of land dealings, with most ownership records having been washed away, individuals and whole families killed in the quake and tsunami, and entire land use and values changed due to the damage caused by the catastrophic event. All of these factors combined created a need to develop completely new processes to deal with each of the unprecedented issues. Over the years this required the execution of more than 4,000 land acquisition processes, including all of the research, development of forms and procedures, re-establishment of boundaries and individual negotiations.



*Local meetings helped in gaining legal access to the required right of way and to resolve community issues to gain acceptance and facilitate construction of the new road.*

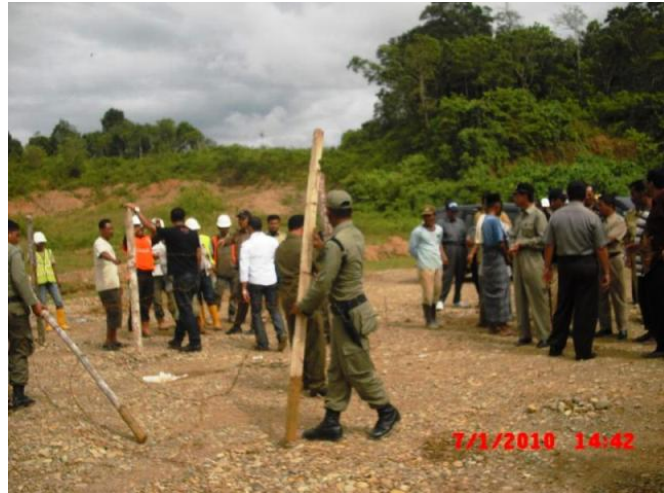
The Indonesian Government had the option to enact the principle of eminent domain if negotiations with landowners failed as a means of accelerating the acquisition of right of way for the public welfare. Indeed, there are few instances where eminent domain would have appeared more justified since there are no alternative routes along the coastline other than the Aceh Road. Nevertheless, this option would have inevitably lead to community revolts and an overall longer duration to obtain the required right of way than allowing parcels to be obtained through negotiations one by one. Also taken into consideration were the recent peace negotiations which might have

been challenged with military intervention supporting implementation of the eminent domain process.

Houses and public facilities such as mosques and schools were also among the obstacles that were located within potential road corridors. A shift of the road alignment by just 30m to avoid a single obstacle could cause the new road corridor to impact many other obstacles that were not touched by the originally proposed alignment. Despite these inevitable conflicts between the road and traditional sites, most were quickly and peacefully resolved as the overwhelming majority of the Acehnese people were anxious for their new road.

**Community Outreach/Work Blockages**

Nevertheless, the acquisition of the required right of way at times resulted in individual resistance, work blockage and public outcry, all of which over the long period of time were resolved one by one. The potential for violent conflicts in the field was one of the major concerns at the onset of the project as the Aceh region had been afflicted by 30 years of insurgency and civil conflict prior to the tsunami. This concern proved to be valid as security threats were one of the contributing reasons that lead to a suspension of work in the central section of the alignment.



*Placing responsibility on the Aceh Government proved to be an effective tactic at limiting violence and extortion attempts aimed at inflating the project cost for personal benefit.*

There also have been isolated security incidents that caused temporary stoppages and numerous obstructions erected by local landowners as a means of accelerating compensation for their land or as leverage for an additional drainage culvert in locations where a landowner feared the new road would block the natural flow of water. Opportunistic individuals have also attempted to obstruct construction as a tactic to extort additional unjust payment.



*Construction often had to be suspended while access was obtained to the Aceh Road corridor including at this 50m stretch.*

As work began to move forward other issues surfaced which for a developing country should be expected and particularly one devastated by such a tragic natural disaster. Skill and workmanship of local craftsmen was marginal at best and required close oversight. This was also not a simple solution, as many of the field personnel for the construction management contractor were also local personnel from the island of Java. Ethnic differences from island to island also had an impact on the work. By tradition the Acehnese have an affinity for all other members of their society, and as such they resisted having individuals from other regions come to the project location to perform skilled work

even though the required skills for the project work did not exist in the province of Aceh.

In order to successfully proceed with the necessary work, the project contractors needed to merge local labor with skilled labor from other regions. This provided an opportunity to develop local skills and craftsmanship, thus increasing the general skills in the local labor market and adding to the economy of the region.

Construction techniques consisted of a combination of modern standards and traditional methods, for example the use of coconut palm supports for erecting bridges and as shoring for large box culverts. Regardless of how old or traditional the methods were, they provided for excellent structures along the traveled way. Nevertheless, some of the traditional methods which impacted the environment were limited in favor of modern methods for density determination, form making, and certain prefabrication erection methods.



*The transfer of technology, knowledge and experience in road construction to the Aceh workforce is contributing to the long term growth of the region.*

The majority of the people that lived along the new road’s alignment did not have advanced educations but still had formal opinions based on tradition which occasionally lead to strong resistance to specific work operations. Such resistance surfaced in several manners including the posting of signs refusing access to work areas, multiple group demonstrations and blockages, as well as physical beatings of project workers. When such occurred it became necessary to gather the dissidents, the contractors, the local government leaders, the police and sometimes the military together to openly discuss the problem and the alternatives so that the work could move forward.



*Local construction methods were frequently employed, such as the use of coconut palm towers to support the erection of steel bridges.*

As an example, when the local community resisted the replacement of a deteriorating existing bridge with a new box culvert by blocking access to the work area, USAID stopped the work and over a period of several weeks, met with local community leaders and regional officials, conducted additional site reviews and made a simplified presentation to the village community. With the support of the regional officials and with a better understanding of the benefits of the new culvert following a technical presentation, the villagers unanimously voted to support the project.

Work restarted the following day and the local community, now pleased with the new facility, has developed additional commercial facilities in the area.



*Construction of a new box culvert to replace an aging bridge was temporarily suspended due to community resistance. Construction resumed after villagers pledged unanimous support following a nighttime presentation by USAID.*

In a few extreme instances, communities were advised that continued resistance to the work would result in cancellation of certain portions of the work. On one occasion where the threats and violence were significant and the contractor's progress was minimal, the construction of 12 kilometers of new road and four bridges was cancelled. This cancellation created hardships on



*Equipment was burned during an unsuccessful attempt to extort inflated prices for raw material.*

all stakeholders: the community, the contractor and the funding agency. Funds had to be set aside to settle claims against the cancellation while additional funding had to be requested to enable the suspended work to go forward under a new contract. This created a two year delay, which provided ample time for periodic meetings with the dissidents and the local government to resolve issues and allow the work to eventually move forward without resistance.

As the threat to life caused by the devastation of the tsunami diminished, at times greed took over. One of the more notorious incidents involved the burning of equipment, throwing of Molotov cocktails

and threats to kill everyone in the contractor's camp to extort higher prices for raw material and to prevent the contractor from using alternative sources. This issue as well as similar others was addressed quickly and carefully with the assistance of the local and regional authorities, directly with all parties involved.

### **Other Challenges**

Weather was another unpredictable challenge. As there was no reliable historical climatological data for the area, design assumptions had to be made for the sizes of bridges and culverts based on topographic mapping, site inspections, pre-tsunami facilities and regional experience. For the



*A surge in a river following days of heavy rain washed away a temporary river crossing at the site of the construction of a new steel truss bridge. A collapsed Bailey bridge can be seen on the left as can piles for the new bridge's center pier foundation on the right.*

most part the assumptions worked well. However, during some isolated occasions, unexpectedly large concentrations of rainfall caused rapid flooding that washed out all developing work in the area. In extreme cases, temporary alternate transportation routes, often by raft, were required. Such sudden and destructive occurrences were discouraging, costly and introduced unplanned setbacks in either work progress or shipment of goods through the areas affected.

Reluctance of the contractors to plan ahead as well as procure materials and equipment in advance provided challenges in themselves. These issues provided visual indications to the surrounding communities that the highway that was so dearly needed

was either not developing in the expected manner if at all, which frequently resulted in negative media publicity. Unlike more modern countries or road projects which are part of a stepped planned development and part of a national development, the Aceh Road work was needed all at once along the entire length of the 146 kilometer alignment.

Several elements were easily noticeable that contributed to the lack of progress in accordance with the approved construction schedule. First, access to many areas was lacking, which frustrated contractor interest to progress in some sort of flowing work pattern. Second, the contractors were not willing to mobilize sufficient equipment to facilitate work along the entire project length simultaneously. In addition, many construction methods employed were of earlier periods in time which did not compliment the need for rapid execution. This also fueled malcontent along the entire system which surfaced from time to time at random locations.



*Sign on barricade erected by local community during land compensation dispute. ("Bupati & Gubunurt idk menepati janji" translates to "District Head and Governor do not keep their promise")*

Over the period of construction it became necessary to develop strong working relationships with the provincial and local governments in order to have assistance in addressing the issues which often resulted in work disruptions and at times complete shutdowns in varying local areas. For these locations assistance was sought through the governor's office as well as the local level. A standard procedure for relocation and re-burial of impacted graves was developed. A process of obtaining police support and enforcement was developed, and a process for directly dealing with

unhappy landowners was also successfully developed. There were many occasions when one or another of these processes had to be re-visited for certain locations where resistance was more defiant.



*USAID coordinated the assistance of local government officials to resolve community and land acquisition issues, which were on occasion resolved door to door.*

Environmental impacts were of high concern from the start. In an effort to provide strength to the Indonesian program development, the U.S. Government provided advisors to assist in developing the environmental assessment of the region and the planned project. To establish comprehensive environmental mitigation measures in accordance with international requirements, the Indonesian and U.S. environmental standards were combined rather than selecting several more significant aspects of the two documents for implementation. In the project area there had not been any history of environmental interest or concern, and enforcement of

environmental practices was generally unprecedented.

This made implementation of the project environmental requirements a huge challenge. The process began with the requirement for siltation protection to be installed at bridge and culvert construction sites. Areas which were disturbed by project activity also required mitigation and/or rehabilitation. Borrow areas and work outside the project right of way which was disturbed by project activities also required mitigation for the environmental impact. This resulted in shaping and dressing the borrow areas and in other cases planting mitigation areas with literally thousands of hardwood trees and mangrove plants. In several cases wetlands were created and dressed for public and private use. In one special case, a rock streambed and its



*Measures were taken to mitigate the impact of the road construction on the environment. Curtains were installed at bridge and culvert sites to prevent sedimentation into the waterways. A wetland was created at the base of a high embankment area by planting Nypah palms, Giant leather ferns, Phragmites (reeds) and floating native species.*

natural surroundings that were to have been altered by the installation of a drainage pipe were able to remain undisturbed and intact as the drainage was altered to utilize a unique box culvert with two sides anchored to the in situ condition and using the natural rock base.



*Friend of the project team*

Special attention was given to wild birds and animals, including turtles, wild boar, deer and the endangered Sumatran Tiger. To our knowledge no specie was displaced due to the development of the new national highway.

With the work occurring in rural regions of the country, safety was of large concern both on the project and within the communities and adjoining areas. Good safety practices had to be taught and reinforced in the employees. In addition, concern for the public and their lack of knowledge of safe practices also had to be an integral part of the road development program. Even a fundamental element of safety, namely the use of personal protective equipment, had to be constantly monitored over a local workforce that was previously more comfortable working in sandals or even bare footed. This persistent monitoring effort significantly reduced the incidence of accidents on the project and adjacent areas. Workers gained a better understanding of the importance of safe practices, and in one case, one of the contractor's safety managers that left the project and was re-assigned overseas for his company, received media recognition for his skills and demonstrated increased knowledge and acquired leadership that he obtained on the project.



*Flagging training provided to local workforce is one example of the introduction of international safety procedures and standards.*



*Site walk with representatives of USAID, the Indonesian Government, the construction management contractor and the construction contractor to inspect a completed segment for deficiencies prior to the start of the one-year warranty period.*

In addition to the design and construction of the road to international standards, USAID developed and implemented a standard written procedure for the turnover of completed sections of the Aceh Road to the Indonesian Government. This process also has been beneficial for the local government in accepting responsibility for the product of such a large grant, which has in the process changed the nature of all of the communities along the entire right of way.

### Summary/Conclusion

With an ultimate investment of over \$280 Million, the Aceh Road project is one of USAID's largest infrastructure commitments. However, the rate of return of this generous undertaking cannot be computed just as a dollars-and-cents boost to Aceh's recovering economy but consideration must also be given to the immeasurable improvements in the way of life of the local people. The smooth new road offers motorists the pleasure of traveling the scenic coastal route without becoming carsick from bumps and turns and, among the countless number of contributions to a better society, allows pregnant women to safely travel to clinics and students to attend school from great distances.



*The Indian Ocean looms beyond a large rock cut section of the Aceh Road corridor.*

The USAID-lead Aceh Road team was comprised of a unique collection of expatriate and Indonesian professionals dedicated to the mutual goal of completing this landmark project to very high international standards of quality. As on any groundbreaking project, there were lessons learned along the way. These were overcome by an extraordinary team effort to keep the project moving forward, even if at a slower pace than originally envisioned. By achieving the inevitable successful completion with a "never quit" approach, the Aceh Road Project will serve as a role model for future emergency relief projects in similarly challenging locations in developing countries and around the world.

The devastation of the 2004 Indian Ocean tsunami combined with the rudimentary Aceh environment brought forth hardships, particularly during the early stages prior to Aceh reconstruction. These included a lack of hotels, housing, sanitary facilities and clean fresh water, travel that was over the winding and rutted temporary road that enticed migraines and carsickness, and the ever present potential for vector borne illnesses such as dengue fever and typhoid. Mother nature contributed earthquakes, torrential rain, and landslides that temporarily stopped work and even set it temporarily back for clean up and repairs. Tigers were sighted prowling the Aceh Road corridor, as were other exotic wildlife such as cobras, monkeys, monitor lizards, wild boar, bats, pythons, crocodiles and leeches to name a few. However, these indigenous animals were hardly a factor in the road's construction compared to their human counterparts, who frequently erected barricades on the road corridor in protest of right-of-way and other disputes.



*Landslide instigated by heavy rain temporarily blocked a mountainous section of the Aceh Road.*

Although the aftermath of the tsunami brought forth a peace deal to end the thirty-year separatist insurgency, many of the former constituents in the conflict considered intimidation to artificially inflate material prices or coerce tributes as an easy means of income. This tactic undoubtedly has worked on locally sponsored projects and possibly other internationally funded projects, but in general not the Aceh Road Project. USAID projects are performed under the strict U.S. Federal Acquisition Regulation (FAR) guidelines that do not tolerate corrupt practices. Armed only with an overarching threat to stop work, USAID countered the bullying by gathering the

*...“But what has been completed resembles no other road in Indonesia. It is superbly constructed, its blacktop flat and smooth, its bridges bearing gleaming USAID emblems. It offers a promise of what is still to come, and most residents seem to welcome it.”...*

Gelling, Peter  
New York Times  
December 25, 2009

assistance of the local government and promoting due process. The local people were encouraged to play a practical role in the construction and to ultimately take ownership of their new road. While this example of proper business practices and community participation by itself cannot change the attitudes of rogue individuals following decades of armed insurgency, it is contributing to an evolving local mindset.

One of the secondary goals of the project that contributes to the long term growth of a developing region is the transfer of knowledge and experience. USAID has succeeded not only in the construction of a new road but also in educating the local workforce regarding international standards in roadway design, construction methods, safety and environmental management that will improve the quality of future Aceh roads. Thus, the legacy of the project will not just be a new road but a higher standard that will improve the quality of future Aceh roads.



*Geofoam was used in location where zones of low strength underlying soil could lead to global embankment instability. Its use was unprecedented in Indonesia on road construction and is an example of technology transfer.*

The rate of travel from one end of the project to the other has been reduced from 12 hours to approximately 3.5 hours, thus enhancing the farm to market considerations for the region. Growth and strength can be noted with commercial business encroaching at the edge of the road in growing numbers. Numerous testimonies to business enhancement by owners / operators can be noted in USAID’s program website [www.acehroad.org](http://www.acehroad.org)

- Along the way over a period of approximately 6 years the lives of more than 4,000,000 Acehnese have been impacted and improved.
- Many social and professional skills have been upgraded.
- The local economy was stabilized and in many cases dramatically improved.



*The new road is stimulating development throughout the corridor including this new modern petrol station at the approximate midpoint between Banda Aceh and Calang*

- Provisions have developed to expand fresh food and frozen food markets due to improved transportation facilities.
- The provided transportation link is sustainable considering levels of skills and equipment available through the Indonesian Government programs.
- Improved travel facilities have significantly enhanced access to medical emergency facilities and provided improved access to higher education facilities in the provincial seat.

- The highway development has enhanced social communications along the entire length of the province.
- The new road corridor also serves newly installed infrastructure such as a fiber optic cable and industry water lines.
- Lessons learned have been well documented for future application and have been used as a resource associated with the recent devastation in Haiti.

There are many benefits of the new Aceh Road including reduced driving time and costs, increased driving comfort and improved safety. Collectively, these benefits offer a better way of life for the Aceh people and add stability to the region, which are the primary building blocks for the recovering Aceh economy.



*The new Aceh Road will add stability and improve the well being of the Aceh people.*

Undoubtedly the aspect of the project that is most appreciated by the hundreds and thousands of daily users is the road's exemplary quality. The Aceh Road has already been cited in esteemed publications such as the New York Times and National Geographic Explorer for its silky smooth surface that stands out over typical Indonesian rural roads. The bridges also exceed the Indonesian standard by providing greater width and independent pedestrian walkways.

Finally not to be overlooked, there is no longer a threat to life and in fact it appears that the highway has also contributed to a developing peace in a long term militant region of the country.



*During an event to commemorate the completion of the Aceh Road that included a ceremonial ribbon cutting, Aceh Governor Irwandi Yusuf stated “We deserve to be proud because the quality of this road is as good as those roads built on American soil. In fact, the Minister of Public Works who visited Aceh last June admitted that the quality of this road is, on average, above the quality of our national roads. Ladies and gentlemen, we have to admit that our struggle to build this road was not easy. There were a lot of challenges and social turbulences which we needed to solve well. The construction of this road has definitely provided positive impacts on the transportation in the Western-Southern parts of Aceh and this road can connect West-South coast with East-North coast. We hope that all of these changes can positively impact the economic developments and social dynamics of people living in the West Coast. We hope that the obstacles that we faced during the construction of this road can become invaluable experience for us when dealing with various communal and social problems in the future.”*



*The new Aceh Road has improved the quality of life of more than 4 million Acehnese.*

## **Appendices**

1. National Geographic TRAVELER (collection edition), “Observing Nanggroe Aceh Darussalam Alignment”, August 2010, Vol. 2, No. 5
2. Gelling, Peter. “Bumpy Journey to Rebuild Aceh After Tsunami.” New York Times. December 25, 2009
3. Perlez, Jane. “After Tsunami, Intentions to Build but No Road Yet” New York Times. October 5, 2006
4. Human Interest Articles (Posted on Project Website)
  - a. Treasures Inside A Bat Cave
  - b. A Dream From Freshwater Fisheries in Meunasah Ba’u
  - c. Ramadan Blessing for Sabirin
  - d. Lamtui Goat Milk Breeders
  - e. The Lhoong Wedding
  - f. The Road To West Coast Paradise
  - g. USAID contractor once again comes to the rescue
  - h. Community training enhances road safety
  - i. Rapidly installed emergency bridge restores traffic and wins Governor’s praise
  - j. Fishing for The Future
  - k. A Bridge To Prosperity
  - l. A Good Road to Better Health
  - m. The Bailey...A Bridge Over Stormy Waters
  - n. A Safe Road
  - o. USAID Ensures Quality
  - p. Building Bridge To The Future
  - q. It Takes Team To Build A Road
  - r. The Pudeng Saddle
  - s. Marzuki and his Small Restaurant
  - t. Blasting Our Way Through To A New Road
  - u. Banda Aceh to Calang Connection Vital for Livelihoods
  - v. Hope for the Hunted Sea Turtle
5. Daniel, Thomas, “Challenges of Emergency Relief Road Construction in Developing Countries” and poster that were presented at the 16th International Roads Federation world meeting, Lisbon, Portugal, May 2010
6. Magliola, Robert “Up-tempo number - Standard designs and limited types speed bridge and road reconstruction in remote Indonesia” Road & Bridges, September 2009

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**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 1**

**National Geographic TRAVELER (collection edition), “Observing Nanggroe  
Aceh Darussalam Alignment”, August 2010, Vol. 2, No. 5**

 NATIONAL  
GEOGRAPHIC

**BONUS:**  
Peta Wisata  
Lintas Barat Sumatra

# TRAVELER

Volume 11 No. 5 2011 Rp 25.000

ALL TRAVEL, ALL THE TIME! AGUSTUS 2011

## 5.155 km Mencumbu SUMATRA

Ninggine Aceh Darussalam • Sumatra Utara • Sumatra Barat  
• Jambi • Sumatra Selatan • Bengkulu • Lampung





# Pantauan Ruas Jalan Nanggroe Aceh Darussalam

Dalam menjelajah Nangroe Aceh Darussalam, Team Bravo WLB5 menggunakan rute original: Banda Aceh - Krueng Raya - Banda Aceh - Lhok Seudue - Lhoong - Lamno - Teluk Lambeuso - Babah Dua - Kuala Unga - Babah Awee - Kruet Seumangat - Calang - Meulaboh - Krueng - Batee - Blangpidie - Manggeng - Samadua - Tapaktuan - Suok Bakung - Trumon - Subulussalam - Penanggalan - Singkil.

Pantauan kami, ruas Banda Aceh - Krueng Raya dalam kondisi nyaman dilewati. Sementara jalan raya Banda Aceh - Lamno, pada beberapa titik sudah difasilitasi bantuan pemerintah asing, membuat nuansa seakan berada di atas highway negara-negara bagian A5. Pada beberapa bagian, jalan terputus dan kendaraan mesti diarahkan ke jalanan batu dan tanah diperkeras. Tak jarang dijumpai kubangan lebar, hingga mesti dieksekusi ekstra hati-hati. Untuk mencapai Babah Awee dari Lamno dan rute Kruet Seumangat, mesti menggunakan jasa penyeberangan rakit. Pada ruas Teluk Raya - Calang - Meulaboh, terdapat jalanan murni tanpa aspal, saat mobil melaju meninggalkan kepulan debu tebal dari jalanan. Hal ini juga mesti diwaspadai, karena menyebabkan kendaraan dari arah berlawanan sulit dilihat. Jarak pandang jadi terbatas.

Tidak boleh luput dari perhatian adalah pembacaan rambu-rambu jalan. Pada jalanan berdekatan tebing dan tajuk-tajuk cadas sepanjang pesisir, biasa dijumpai tanda "hati-hati berpotensi baluan jatuh." Sedang di beberapa area, terdapat ikon sapi atau kerbau, pertanda kawasan menjadi tempat perlintasan satwa. Pada malam hari masih banyak dijumpai sapi atau kerbau tidur di atas aspal untuk mencari kehangatan. **-MANGGALANI R UKIRSARI & MAHDI MUHAMMAD**



# MELIBAS TANTANGAN SUMATRA

*Menyusur sungai, pantai, trek off road dan jalan raya sepanjang 12 hari.*

Langit di kawasan Lamno, Kabupaten Aceh Jaya, berwarna biru dramatis tanpa awan, seolah ingin berlomba dengan lautan di bawahnya. Pada sebuah estuaria, masih tersisa fondasi jembatan terbelah-belah. Bekas-bekas tsunami empat tahun silam. Untuk sampai ke seberang, sarana ini tak memenuhi syarat lagi untuk dilewati. Hingga Toyota Hilux Tipe G Diesel double cabin mesti diseberangkan rakit dari Krueng (sungai) Lambeuso menuju Babah Dua.

Penyeberangan lintas sungai itu sangat menggugah semangat ekspedisi tim Wisata Lintas Barat Sumatra (WLBS). Sebagai wahana apung, penyedia jasa penyeberangan mengikat tiga perahu menjadi satu. Lalu bagian atasnya dibuatkan semacam panggung dari lembaran kayu. Di sinilah tunggangan tim WLBS yang memiliki bobot kosong 2.755 kg dengan kargo dimensi (1.520 1.515 x

nonaspal Krue Seumangat.

Sesudahnya, kondisi jalanan yang dilakoni makin beragam. Mulai ruas setengah jadi bernuansa mirip deskripsi jalan raya bebas hambatan di Negeri Paman Sam, trek tanah merah dengan debu mengepul tinggi ke udara, hingga jalanan nonaspal yang menjorok sampai ke bibir pantai. Sepanjang hari itu, si perkasa Hilux bersama tim WLBS menempuh jarak tak kurang dari 200 km dari Banda Aceh menuju Calang dan Meulaboh di Provinsi Nanggroe Aceh Darussalam (NAD).

Unsur ketahanan atau durabilitas yang dimiliki double cabin produksi PT Toyota Astra Motor (PT TAM) memang menjadi dasar utama pemilihan transportasi darat, saat tim WLBS mengagendakan ekspedisi ribuan km melintasi tiga provinsi di Sumatra; NAD, Sumatra Utara dan Sumatra Barat. Kondisi jalur lintas

### **Observing Nanggroe Aceh Darussalam Alignment**

**(page: 25)**

Exploring Nanggroe Aceh Darussalam, The Bravo Team from Sumatra West Lane Tour (Wisata Lintas Barat Sumatra) took the route: Banda Aceh – Krueng Raya – Lhok Seudue – Lhoong – Lamno – Teluk Lambeuso – Babah Dua – Babah Awee – Kruet Semangat – Calang – Meulaboh – Krueng Batee – Blangpidie – Manggeng – Samadua – Tapaktuan – Suok Bakung – Trumon – Subulussalam – Penanggalan – Singkil.

From our observation, Banda Aceh – Krueng Raya alignment in silky smooth condition. Meanwhile, in some places between Banda Aceh – Lamno alignment, because the alignment had constructed by the donation from foreign government, it feels like driving on the US Highways. However in some other places, the alignment was blocked, so the traffic was moved to unpaved road. The mud hole also found in some places, made drivers should be careful when passed it. It should take a ferry to cross from Lamno to Babah Awe and Kruet Seumangat.

The unpaved alignment also found In Teluk Raya – Calang – Meulaboh, the dust came up in the wind when a vehicle passed and it limited the visibility, so the driver hard to see the car came from opposite direction.

Last but not least, in alignment locations near cliffs, usually found road sign “be careful for rock fall”. In some area found road sign with “cow” or “buffalo” symbol, meaning cattle frequently pass in those locations. At night those cattle could be found stay and slept on the warm asphalt. **MANGGALANI R UKIRSARI & MAHDI MUHAMMAD**

### **Advertorial: Defeating The Sumatra Challenge**

**(Page: 38)**

...

After that, the team faced various alignment conditions, from almost complete alignment that looked like the highways in the Uncle Sam’s country, dusty track with the flying dust when a vehicle passed, and unpaved alignment along the beach. On that day ... traveled not less than 200 km from Banda Aceh to Calang and Meulaboh in Nanggroe Aceh Darussalam Province (NAD).

...

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 2**

**Gelling, Peter. "Bumpy Journey to Rebuild Aceh After Tsunami." New York  
Times. December 25, 2009**



# Bumpy Journey to Rebuild Aceh After Tsunami

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Ulet Ifansasti/Getty Images

Reconstruction work in Banda Aceh, Indonesia, on Friday.

By PETER GELLING  
Published: December 25, 2009

BANDA ACEH, [INDONESIA](#) — It may be a testament to the reconstruction effort that, at first glance, the only clear evidence of the tsunami that obliterated much of the north Indonesian province of Aceh five years ago is a smattering of decapitated palm trees, the occasional foundation where a house once stood, and the ubiquitous initials of [U.N.](#) agencies, stenciled on everything from warehouses to food carts.

[Enlarge This Image](#)



Fauzan Ijazah for The International Herald Tribune

The construction of this bridge is part of a road project from Banda Aceh, the capital of Aceh Province, to Calang to reconnect displaced communities to the outside world.

A first-time visitor might not guess that huge swaths of this nearly empty landscape, stretching 800 kilometers, almost 500 miles, down western Aceh's coast, were once crowded with thousands of homes — all swept away in minutes by a wave.

The Dec. 26, 2004, tsunami, caused by a 9.1-magnitude undersea earthquake, slammed 13 countries, killing about 226,000 people.

But it was the Acehnese who bore the brunt of the catastrophe. The provincial capital, Banda Aceh, was devastated. An estimated 170,000 people here were killed, including 35,000 whose bodies were never found.

In the five years since, more than 800 nongovernmental organizations, multilateral agencies and donor countries have combined to spend \$6.7 billion, nearly all the amount pledged from around the world to rebuild Aceh. Although by most accounts it has been a success, the process, still incomplete, has not been without challenges.

No functioning government existed here in the early days to coordinate the arriving international aid agencies. While Indonesia's central government mobilized during the emergency phase, it would be four months before it set up an agency to manage the reconstruction.

Questions of land ownership, obscured by the destruction of property and records, also delayed rebuilding. Perhaps the greatest complication was the three-decade-old

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separatist conflict in Aceh, which ended in a peace deal between the rebels and the government six months after the tsunami.

It was in this climate that the United States won the right to build its signature project — a \$250 million highway running 150 kilometers down Aceh’s western coast, from Banda Aceh to Calang, to reconnect displaced communities to the outside world.

Managed by the U.S. [Agency for International Development](#), the project was seen by Jakarta and Washington as vital both to immediate reconstruction and to Aceh’s economic development for decades to come.

U.S. officials hoped the project could sow good relations in a conservative Muslim area that had previously known little tourism or other foreign involvement because of travel restrictions during the civil war. They also foresaw a showcase of American engineering.

What it has become is a testimony to the myriad problems, as well as achievements, that have attended the overall reconstruction effort.

“There have been so many issues,” said Wahyu Purnama, construction manager for Wika, the Indonesian contractor hired by Usaid. “I have worked on foreign projects all over the country, some very big projects, including major roads. But I have never seen anything like this.”

Less than half the planned road has been finished. It ends dramatically in a half-built bridge hanging over a river in the village of Lamno, where local residents operate a huge raft to ferry vehicles from one shore to the other.

But what has been completed resembles no other road in Indonesia. It is superbly constructed, its blacktop flat and smooth, its bridges bearing gleaming Usaid emblems. It offers a promise of what is still to come, and most residents seem to welcome it.

“The new road has made getting around so much easier,” said Romi, 42, who lost his wife and house during the tsunami and now sells fish to people visiting the river near his new home. “Before the road this area was totally isolated,” he said. “But now people can drive an hour from Banda Aceh to sit by the river and have picnics.”

Before the tsunami, he said, very few people traveled to his village because of the fighting and the many military checkpoints along the old meandering road between his home and the capital.

Mr. Romi’s new house lies hundreds of meters inland from where his old one had stood near the water. It is one of several hundred, all identical and bearing the names of their builders — Mercy Corps, Oxfam, International Red Cross. There is also a new schoolhouse, mosque and clinic.

“It’s difficult for me emotionally,” he said. “But I got married again and have a new home. And I have a job. These things help me to move on. Nothing will ever be the same, but things are getting better.”

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A version of this article appeared in print on December 26, 2009, in The International Herald Tribune.

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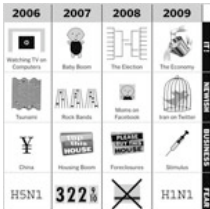
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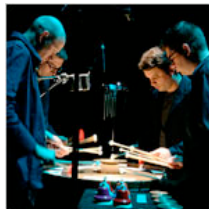
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## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 3**

**Perlez, Jane. “After Tsunami, Intentions to Build but No Road Yet” New  
York Times. October 5, 2006**

# Delays mire U.S. road project in Aceh

By Jane Perlez The New York Times

Published: October 8, 2006

**KEUTAPANG, Indonesia** A \$245 million stretch of blacktop intended to be the signature good-will gesture from the American people to survivors of the 2004 tsunami has instead become a parable of the problems of Aceh's recovery.

Construction of the 240-kilometer road, about 150 miles, along the devastated coast has yet to start, stalled by a host of obstacles, like acquiring right of way through residential and farm land; schools; and, particularly sensitive, several hundred graves of mystical and religious significance.

Though villagers welcome the idea, some have reservations about an American-style thoroughfare with a wide shoulder on either side that will replace the ribbon of churned dirt and mud. Villagers say they fear speeding traffic - they have thrown rocks at fast-moving cars of foreign aid workers - and want to be able to sell snacks and tea from stalls snug by the roadside, as they have always done.

The difficulties of getting started on the road, one of the largest infrastructure projects in Indonesia, reflect the weariness among tsunami survivors with the long return to normality.

A demonstration outside the main Indonesian reconstruction agency turned violent last month when protesters complained they still lacked basic services and demanded more money for education.

The patience of American officials is wearing thin, too. They complain that the government has been too slow in buying up the land and resolving the fraught issue of the graves.

Lately, the Americans have become so disconcerted about delays that they have tried to pry more action from the Indonesians by suggesting that the money for the road could be diverted to the United States reconstruction efforts in Lebanon.

"It was threatened they would take the money away," said Kuntoro Mangkusubroto, director of the Indonesian rehabilitation and reconstruction agency in Aceh. He added with a shrug: "That's standard. I just swallow everything for the sake of the road."

The Indonesians say the Americans are imposing first world standards of efficiency on a poor region that was pounded by civil war and then swamped by the tsunami, which killed more than 100,000 Indonesians. Records of land titles were washed away, and questions of inheritance among devastated families take a while to decide, they say.

The idea for the road evolved soon after the tsunami when the Bush administration wanted to show that the United States cared about Indonesia, the world's most populous Muslim country, in its moment of need.

It was decided early on to finance one substantial American project that would make a splash rather than a number of smaller ones. At first, rebuilding a significant portion of the provincial capital, Banda Aceh, into a kind of "signature city" was proposed.

Instead, a well-engineered road from the capital to Meulaboh, the southernmost coastal town, which was nearly completely wiped out, was considered a more fruitful project that played to the American strength of fast and modern construction. The new road would connect the poor fishing communities of the wasted west coast of Aceh to the outside world.

But the Americans did not anticipate the long negotiations over compensation for land or the strong local feelings about the graves.

Tucked under a grove of coconut trees, a pale-hued boulder and an ancient tree trunk represent this village's most mystical grave, the place where a white tiger is believed to run loose in the event of human transgression. Nearby, red and yellow flags left by surveyors indicated the American road is set to plow right through the sacred spot.

A local elder, Mohammed Noor, 60, who forded a river and clambered over fences to show off the grave, says he cannot imagine that it could ever be moved.

The problems with the road have not only to do with Indonesian sensibilities. An audit by the Inspector General of the United States Agency for International Development last March said the design of the road was delayed because the development agency asked the contractor to modify the design plan at least four times.

It also noted that when the contract for the engineering work was awarded to the American firm Parson Global Services, it was awarded in November, four months late.

By May, when the process was bogged down, a veteran of building big American projects abroad, Roy Ventura Jr., was brought in by USAID to expedite things.

On June 29, Ventura said he presented the Indonesians with the final plan for where the road would run. He was told by Indonesian government officials, he said, that right of way would be ready so construction could begin for the first portion of the road to the village of Lhoong by July 25, and by Oct. 3 in the area farther south to the town of Calang.

According to that schedule, American officials said they expected the first eight kilometers of the road to be completed by Aug. 23, and that new sections of the road would continue to unfold after that.

But instead, USAID is paying the Indonesian road contractor, Wijaya Karya, about \$100,000 a month to maintain the old road, money that should be going toward the new construction, American officials say.

"The Americans are arguing that there should have been land acquisition a year ago," said Kuntoro. "But how could that happen when we did not know from the Americans where the road was running until June 29?"

Kuntoro, a graduate in engineering from Stanford University who understands American impatience for fast results as well as he knows the Indonesian preference for discussion, sometimes to the umpteenth degree, has become the point man for many of the problems.

He has been visited in his office in Banda Aceh by the American ambassador to Indonesia, B. Lynn Pascoe, by Ventura, and this week by investigators from the General Accounting Office in Washington. They all ask the same thing: When will enough continuous land be ready so that bulldozers can begin clearing the way?

In fact, Kuntoro said in an interview Tuesday, he had just written a letter to Pascoe saying that his agency had gained title to 5.4 kilometers of continuous land and major construction could start.

But on Thursday, Ventura said that he was not satisfied that the titles were transferred, and that work could only begin on a bridge involving a sliver of land.

"The road itself is no different to any place in the world," said Ventura, who was with the Montana Highway department for 10 years and has managed construction sites in Saudi Arabia, Jordan and the Philippines. "The process of getting right to the land to get the road built is very different."

In an exchange with the Governor of Banda Aceh, Mustafa Abu Bakar, the frustrated Americans suggested that the governor consider using eminent domain procedures for speedy possession of the land. In reply, the governor said in a letter that in order to keep community support for the road he would use eminent domain only as a last resort.

"The government sees the people here as victims of the tsunami and very vulnerable," said Eddy Siregar, a construction manager for the Indonesian contractor, Wijaya Karya, as he sat on the side of the old road in the village of Pasi, watching his men do maintenance instead of new construction. "It would be a big trauma if their land was taken. So they want to try the soft way."

Late Wednesday afternoon, Noor got word that his village leaders had agreed with the provincial authorities to move the grave of the white tiger.

"I can't imagine how they will do it," said a crestfallen Noor. "Will they do it nicely, or will they do it roughly?"

## **2011 IRF InARoad Awards**

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**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
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**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4**

**Human Interest Articles (Posted on Project Website)**

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4A - Human Interest Articles (Posted on Project Website)**

**Treasures Inside A Bat Cave**

**(Posted 15 March 2011)**

## Treasures Inside A Bat Cave

Even in its uncompleted state, the new USAID-funded Aceh Road is stimulating the Aceh economy and improving the way of life of the Aceh people by making travel along the coast faster and safer than it ever has been. Motorists are able to drive without unexpected and costly damage to their vehicles from potholes and bumps and without fear of head on collisions with vehicles traveling in the opposite direction competing for small patches of unbroken road.



*Collecting treasures in a cave near USAID-funded Aceh Road*

These are just a few of the obvious benefits of the new road. However, there are literally thousands of individual stories of how the new road is ushering in prosperity by allowing citizens to operate an endless variety of businesses that just a few years ago were fantasies.

Perhaps the first thing that comes to everyone's mind when the words "bat cave" are uttered is the secret headquarters of Bob Kane's fictional superhero, Batman. The Batcave is the hideout that Batman keeps his personal treasures such as the Batmobile, computers and other expensive tools and gadgets to support his crime-fighting activities. A bat cave located about 50 kilometers south of Banda Aceh is nothing like Batman's cave. This cave



*A Bat Cave in Lhoong (about 50 kilometers south of Banda Aceh)*

is real but, like its fictional namesake, contains valuable treasure in an unbelievable form that would have otherwise been unutilized were it not for the new Aceh Road.

Guano, one of the treasures found in large amounts inside the real bat cave, is the excrement of cave dwelling bats. The question most readers must ask is “How could common bat dung be valuable?” The answer is that after processing, guano can be used as a highly effective fertilizer due to its high levels of phosphorus and nitrogen.



*Guano, the valuable treasure from bat's excrement*

Mr. Junaedi, who owns the property where that bat cave exists, said every sunny day, he can pack about 100 sacks of dry guano that contain about 40 kilograms each. From its original location inside the bat cave until dry and ready to pack, Mr. Junaedi and his employees stuff wet and fresh guano into sacks inside the cave, then employ a “flying fox” method to carry the sacks of guano via a big rope to a nearby field where the guano can dry and be reprocessed.

Usually it will take three or four days to dry the guano when sun shines brightly. After that, Mr. Juanedi and his employees must classify the dried guano based on the sizes of the guano chunks. Guano with smaller chunks is more expensive than guano composed of larger chunks. The price ranges about US\$45 to US\$80 per sack depending on the size of the chunks.



*The Flying Fox method of transporting guano from the cave to the drying location*

Considering the price per sack and the amount of guano produced every day, nobody denies that the treasure inside the cave. No wonder Mr. Junaedi was more than happy when he realized that the new USAID-funded Aceh Road was aligned near his property to allow him easy access to his valuable guano.

Mr. Juanedi's bat cave in Lhoong is actually one of two bat caves that he owns and operates. Long before the new Aceh Road was constructed he operated another bat cave near Lamno (80 kilometers south of Banda Aceh). Even though the guano quality from that cave is quite good, the mining productivity of guano in this second cave has been low due to the cave's remote and difficult to reach location far from even a dusty and muddy local road. This made the transport of the guano to Banda Aceh difficult and costly and, of course, added production cost that cut into Mr. Junaedi's profit. At that time, producing 100 sacks dry guano a day was a dream. Meanwhile, his bat cave

in Lhoong was nearly impossible to reach due to its remote location in the middle of the jungle where there was no footpath and tigers prowled.

Thankfully for Mr. Junaedi, the new Aceh Road was constructed near his second bat cave so that he can profitably mine guano from it. With the cave and the open field in front near the Aceh Road alignment, the process of mining the guano inside the cave, drying it, packaging it, and transporting it can now be conducted quickly and easily.



*Guano drying and selecting process*

“Just like the old days, this guano will travel for manufacturing and processing, some of it going to Banda Aceh, and the rest directly to Medan.” said Mr. Junaedi.

“The new USAID-funded Aceh Road not only gives easier access for the south and west coast Aceh community going to Banda Aceh or Calang, but also for myself the USAID road helped me uncover a new location where I can mine guano more easily than before.” Mr. Junaedi said.

The Aceh Road has already received praise for its contribution to a new and prosperous Aceh with its state-of-the-art design and facilities. This was USAID’s objective at the start to provide a special gift from the American people, that is unlike any road that Aceh has seen. That the Aceh Road has helped turn dung into a treasure makes it, well, that much more special.

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4B - Human Interest Articles (Posted on Project Website)**

**A Dream From Freshwater Fisheries in Meunasah Ba'u**

**(Posted 19 February 2011)**

## A Dream From Freshwater Fisheries in Meunasah Ba'u

At first glance, Meunasah Ba'u village is just a typical village on Aceh's west coast. It is surrounded by paddy fields, tranquil and peaceful. Like many other villages along Aceh's west coast following the infamous 2004 Indian Ocean tsunami, Meunasah Ba'u village became a relocation village of tsunami survivors.



*Irrigation Channel was used to start Freshwater Fisheries in Meunasah Ba'u*

Meunasah Ba'u village, which is located near Beurayeung Dam, enjoys an unending flow of

water from an irrigation channel that begins at the dam and passes through the village before reaching the nearby paddy fields. Some young people from this community have used this local resource to launch freshwater fisheries by putting nets in the irrigation channel, then breeding the fish. The result was satisfying. In just a few months, the people who started the fisheries built their own ponds in their farms or in front of their homes. With extra space, they were able to breed and produce more fish than they could by using just the irrigation channels.



*Mr. Syarifuddin with his fishpond near his house*

According to one of the group leaders, Mr. Syarifuddin, who now owns eight fishponds, despite all of the experience and knowledge that he has regarding freshwater fisheries breeding, without the ability to market the fish the venture could not be profitable.

Before the USAID-funded Aceh Road was constructed and passed through Meunasah Ba'u village, which is located about 25 kilometers south of Banda Aceh, travel to the market locations such as Banda Aceh, Jantho, and Meulaboh was long and uncomfortable. The pre-tsunami road was badly deteriorated and in some locations no longer existed. As an example, the time to travel 145 kilometers between the provincial capital Banda Aceh and Calang, the capital of the Aceh Jaya Regency, required up to nine hours and, on rainy days, was often impassible. The trip has now been reduced to under four hours and will be even shorter once the road is completed later this year.

Shorter travel time is essential for the fisheries business to be profitable because it reduces the distribution cost not only in the amount of fuel used, but also in the number of oxygen tanks that are required to sustain the fish inside their traveling container. Before the new Aceh Road was constructed, Mr. Syarifuddin needed three oxygen tanks when traveling 220 kilometers from Meunasah Ba'u to Meulaboh. Now, he only needs one tank for this trip.



*Mr. Anshari breeds freshwater fish in the pond in his yard*

Mr. Anshari, another member of the freshwater fisheries' farmers' group, agrees that the time transporting his product to market is particularly important, because he sells fertilized fish eggs (otherwise known as fish seeds), which are more fragile than mature fish. He chose to sell fish seeds because it offers greater profit over a short time. Typically he sells 8,000 to 20,000 fish seeds at a time at a price of about Rp3,000 (US\$0.3) per seed.

Other Meunasah Ba'u community members will likely follow this success, since a private company located near the village is helping them sustain their fisheries. Mr. Adi, one of the company staff, dreams that someday Meunasah Ba'u will become a center of freshwater fisheries farms throughout Aceh Province.



*USAID-funded Aceh Road supports the Meunasah Ba'u freshwater fisheries*

To make Mr. Adi's dream a reality, the Aceh Road makes transportation of freshwater fish to every town in west south coast of Aceh fast, smooth and safe. This not only reduces the cost of transport, but also the cost for the common consumer.

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4C - Human Interest Articles (Posted on Project Website)**

**Ramadan Blessing for Sabirin**

**(Posted 27 September 2010)**

## Ramadan Blessing for Sabirin



*Lamno traditional market during a bustling time*

Welcome to Lamno Market, a typical Indonesian traditional market in a small town of the same name located 80 kilometers south of Banda Aceh.

However, unlike other traditional markets in Indonesia, activity in this market reaches its peak on Sunday, which is called *hari pekan* or market day by local people, when the number of buyers and vendors doubles – even sometimes triples - over ordinary weekdays.



*Lamno traditional market during holy month of Ramadan*

The situation is quite different during the holy month Ramadan, when Muslims fast by resisting temptations to eat, drink, smoke and all other pleasures from dawn till dusk. The period of Ramadan varies from year to year based on the lunar calendar and the sighting of the new moon. This year, Ramadan began on August 11.

During Ramadan, crowds of buyers and vendors are not only seen in this market on Sundays, but every afternoon from 4 pm until about 7 pm, when local people look for a snack, drink and food to break the fasting of that day.



*Sabirin's customers queue at his modified car stall*

Among the many vendors that conduct their business in the Lamno market during this holy month, one man, Sabirin, travels from Banda Aceh to Lamno every day. His product, *cendol*, is a traditional drink consisting of coconut milk, a jelly from rice flour, palm sugar, red beans, mung beans, black sticky rice and ice. Cendol is particularly refreshing for breaking the fast in the evening and popular among the locals.



*Ramadan blessing for Sabirin and his family from his cendol business*

It's no wonder that many local people queue near Sabirin's car, which he modified to be a mini stall, to buy his cendol every afternoon. During Ramadan, this man in his middle thirties earns net profits about Rp 2,000,000 (about \$220) per day. Realizing this, it was an easy decision for Sabirin to travel to Lamno every day at 2 pm, then return to Banda Aceh at 7 pm. Without question, Sabirin was earning his biggest profits since post-tsunami when he started selling cendol.

Sabirin said that this Ramadan was the first time he travelled back and forth between those two cities to sell cendol. Typically, he only sold his product in the Lamno market on Sundays from 9 am to 3 pm.



*The new Aceh Road between Banda Aceh – Lamno*

He noted that before USAID started reconstructing the Aceh Road, Lhok Nga (about 20 kilometers south of Banda Aceh) was the furthest he travelled to sell his cendol. When USAID substantially completed the Aceh Road between Banda Aceh – Lamno and his travel time was significantly shortened as well as much more pleasurable and safe on the smooth new road, he started traveling to Lamno market weekly. Since Ramadan started, he boosted his sales by opening his stall every afternoon in front of the Lamno Health Center Community building near the market.

Even though it is exhausting traveling back and forth between Banda Aceh – Lamno every day, Sabirin believes this is a manifestation of a Ramadan blessing for him and his family so he can celebrate Idul Fitri full of joy and happiness.

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4D - Human Interest Articles (Posted on Project Website)**

**Lamtui Goat Milk Breeders**

**(Posted 15 August 2010)**

## Lamtui Goat Milk Breeders



*Ibu Sumiyati milking Etawa Goat*

One morning, at 6:00 A.M., Ibu Sumiyati, a woman in her mid-forties, moved one Etawa goat (also known as Jamnapari goat) from a barn to a small enclosure to start the milking process. For past three years, this has been a routine for her and about 20 other villagers who joined the Lamtui Goat Milk Breeders in Lamtui village, about 70 km south of Banda Aceh on the west coast of Sumatra.

It was a gamble for Ibu Sumiyati to start her goat milk business. After her home and paddy field were destroyed and her father weakened by 2004 Indian Ocean Tsunami, this was more than just a new venture, it was a means of survival. When the goats started producing milk after one year, her anxieties at her new way of life disappeared.

The Etawa is a breed of dairy goat originating from India and Bangladesh but also found in Indonesia. Male Etawa goat can weigh up to 120 kg, while female can weigh up around 90 kg. The Etawa in Lamtui were imported from Bogor, West Java, and from Medan, North Sumatra.

According to Pak Ali, the coordinator of the Lamtui Goat Milk Breeders, this milk industry started in 2007 using a donation from a United States funding organization that was committed to local economical empowerment for the tsunami victims.



*One of Etawa Goat Barns in Lamtui*

Four barns dedicated to the milk industry were built on Pak Sulaiman's land. Two barns are for the productive goats, and the other two are for the goatlings that are less than four months old.

One year after its start, the Lamtui Goat Milk Breeders began to produce milk. From these two barns, this industry can now produce on average five liters of milk per day as well as meat from the adult male goats.



*Sterilization of Etawa Goat Milk*

The goat milk is tested for diseases. Milk, free from disease, is then put in the pasteurization apparatus. After that, the goat milk is ready to package and distribute to nearby towns.

In the years before the tsunami, the goat milk was distributed via sea to Lamno and other towns nearby. However, the construction of the USAID-funded Aceh Road has made transportation much easier, safer and faster. The transport between Lamtui and Banda Aceh, which took 3 hours on the emergency route constructed by the Indonesian military, now takes just 1.5 hours.



*Lamtui Goat Milk is packaged and ready to distribute*

Pak Ali, who is also a former Keuchik (Village Head) of Meutara village in Lamno, hopes the Aceh Road Project will be completed soon, both to the north and south to allow an expanded market.

For Pak Ali, Pak Sulaiman, Ibu Sumiyati and the other members of Lamtui Goat Milk Breeders, the bridge for a better future is not only dependent on goat milk production, but also in the distribution of their products. For this reason, the Aceh Road is one of their key factors for a better future and a better life.

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4E - Human Interest Articles (Posted on Project Website)**

**The Lhoong Wedding**

**(Posted 15 June 2010)**

## The Lhoong Wedding



*The groom and bride in front of guests in a wedding party in Lhoong  
(56 km south of Banda Aceh)*

It was 5:30 AM on a Sunday morning in Lamno, a small town 80 km south of Banda Aceh. An excited and restless Teguh had awoken before 5:00 AM and was nicely dressed and well-groomed. This was his special day to say goodbye to bachelorhood and start a married life.

His parents, family, relatives, and friends also prepared themselves as the entourage to escort this merry groom to a mosque in Lhoong, a small town about 56 km south of Banda Aceh and about 24 km north of Lamno, where the wedding ceremony was to take place in the next couple of hours.



*Lhoong Office of Religious Affairs, the mosque near this office was where the wedding celebration was held*

About an hour later, four cars including the groom's car, started moving north to *Jami'* Mosque in Lhoong near the bride's home, where the wedding party would be held after the ceremony.

The beautiful bride was born and raised in Lhoong until she met her future husband, who was born and grew up in Tangerang (about 30 km west of Jakarta, and 1,800 km south of Banda Aceh), two years ago while he was working on the construction of the USAID-funded Aceh Road that passes her small town. No one could have predicted that a sweet little girl from this small town would have a husband from a place so far away.



*The location of wedding party in front of the bride's home in Lhoong*

Like all traditional weddings in Indonesia, the ceremony and party would take place in the bride's home. Thus, a few days before this big event, Teguh's parents traveled more than 3 hours in an airplane from Jakarta to Banda Aceh, and then continued with a 2.5 hour road trip from Banda Aceh to Lamno, the place where the groom was preparing for the ceremony.

"When Teguh told me that the wedding ceremony would be held at Lhoong, I imagined that we would be traveling on a bumpy and muddy road. I was afraid of getting travel sickness" said Teguh's mother.

"However, my husband and I had to attend my son's wedding, just like other parents would do for their sons' and daughters' weddings" she continued.

The dread of a muddy and bumpy road soon disappeared as Teguh's mother experienced the silky smooth new road to Lamno. "Thank God, the road is far from what I imagined, there were no bumps or mud. So I could focus on preparing for my son's wedding." said Teguh's mother.

### **The Myth and the Groom's Driver**

Not only were the bride and groom nervous on their wedding day, but also Afdhol, the man who would drive the groom's car. A few days before the wedding, Afdhol heard a myth that if a bride's or groom's car moves backward even just a centimeter, it would bring bad luck and an unhappy marriage. The driver must have extra focus, not to mention good driving skill, when parking the car to avoid moving backward.



*Afdhol, the hardworking driver for the groom.*

It is usually easy to drive a car 24 km without traveling backward, but the situation was quite different for a driver haunted by the myth. He would have greater pressure to not make the mistake of moving backward. In total, the car

would stop and park in three different places; first, at the mosque, then at a home near the wedding party location, and last, at the bride's home where the wedding party would be conducted. Each time the car parked, the nervous Afdhol wiped sweat from his forehead, face, and neck.

At the wedding party, which was the last stop, with sweat still appearing on his forehead, Afdhol looked relieved and cheerful because he had successfully completed the important and formidable task.

Tired but happy he said, "If I had known about the myth and if the road condition to the wedding ceremony was still like --let's see-- five or even three years ago with the mud, dust, and big holes everywhere, I would never have wanted to be the driver of the groom's car. Frankly, the smoothness of the new Aceh Road from Lamno to Lhoong is one of the reasons why I took this duty."

Today, once again, the Aceh Road became a witness for a new stage of life's process for two people who made a holy oath to love and cherish each other and to face the future together.

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

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### **Appendix 4F - Human Interest Articles (Posted on Project Website)**

**The Road To West Coast Paradise**

**(Posted 27 July 2009)**

## The Road To West Coast Paradise

If you drive along the Aceh's west coast, you will be amazed by its stunning beautiful landscapes. Along the way from Banda Aceh to Calang, you will enjoy the exotic allure of white sandy beaches on one side and spectacular peaks of Bukit Barisan Mountains marching down the coast on the other side. The Indian Ocean looks so sparkling and fresh that you want to jump in for a



*Looking at the Indian Ocean straight from Pudeng Road (Km 63)*

swim. If you stop at one of the food stalls at Gereute Peak, you can enjoy the breeze while slurping hot noodle soup and listening to the waves pounding on the reefs.

Sadly, this beautiful scenery became inaccessible when the tsunami swept away the road and the bridges along the Aceh's west coast in 2004. Tourism died as the tsunami cut the transportation link between Banda Aceh to Calang, some 150 km to the south. But those conditions will soon be returned and improved once new and revitalized infrastructure funded by USAID is finished.

In fact, 63 km of the road has been paved. The new paved road has stimulated local economy activities as new food stalls mushroomed along with many other activities including transport of goods and services to many towns along the route. With the new smooth road, people have started to travel up and down the road more often, just like Helmy and his friends do on weekends. Met in one of the food stalls in Paro Mountains, Helmy, who lives in Banda Aceh, said that he and his friends sometimes drive up to the Geurute Peak and stop over to enjoy the scenery. He even mentioned that the USAID road in Lhoong and Pudeng has made the beautiful mountain, forest and ocean scenery looked more prominent.

The Head of Aceh Jaya's Tourism and Cultural Office, Teuku Mufizar, in an interview, mentioned that infrastructure is one of the vital supports for tourism development. "Aceh Jaya district has abundant natural wonders and tourism potential but if we don't have the access road we cannot develop this potential."

A few examples are Rigaih and Lhok Geulumpang Beaches, which are the best spots for snorkeling and diving; Reusam Island, which has beautiful white sand and

safe beaches from which to swim; and Tsunami Island, a new small island that emerged after the tsunami.

The Tourism and Cultural Office has plans for a tourism villages program along the coast and once the infrastructure is put in place, it will improve accessibility to these planned villages. Teuku Mufizar expressed nothing but delight over the reconstruction of the Banda Aceh – Calang road funded by USAID. “The new road will link tourism destinations in Aceh Jaya.”



*The beauty of Indian Ocean, next to the USAID road in Layeun (Km 29)*

Mufizar continued that the development of Aceh Jaya’s tourism would improve community livelihood and welfare. Eliza, who runs a hotel in Calang, agrees. According to Eliza, the hotel business has suffered as many NGOs that supported tsunami relief efforts have completed their work and departed. Unless tourism in the area is developed further, it is likely that this sector of the economy of Calang will suffer. Mufizar believes that once the Lamno – Calang route is paved, the tourism in Aceh Jaya will start to pulse. Eliza feels optimistic about the completion of the USAID’s 254 million dollar Aceh’s west coast road, as it will improve the tourism in Aceh Jaya.

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## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

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### **Appendix 4G - Human Interest Articles (Posted on Project Website)**

**USAID contractor once again comes to the rescue**

**(Posted 29 May 2009)**

## USAID contractor once again comes to the rescue

The construction of the road between Banda Aceh and Calang has felt the full brunt of Aceh's formidable rain in the past few days. Not only was the amount of rain surprising, but so was the timing. Generally Aceh's monsoon season ends in February or March.

But for five days in the middle of May, the rains returned with a vengeance, providing a pummeling reminder to everyone working on the project just how

unpredictable building this vital stretch of road is proving to be. The relentless deluge swam caused rivers to overflow, broke through levee banks, destroyed estuary and harbor embankments, and swept away bridges. Five of Aceh's 23 districts were swamped and thousands of people left isolated.

Among the bridges affected was a Bailey or temporary bridge that was less than a month old. It had been erected late April in Lageun, some 18 kilometers north of Calang, by the Indonesian army, when the existing Bailey bridge built during the tsunami emergency buckled under the weight of an overloaded truck.

This time it was the sheer weight and turbulence of the water that caused the damage. The ever increasing volume and speed of the water rushing to the ocean eventually burst through the dirt road that served as the new Bailey's southern abutment, leaving it virtually "legless" and in great danger of being swept away.

Fortunately, no one was injured in the incident. Nevertheless, such events do seriously disrupt people's lives. People traveling on motorbikes and in small vehicles had to queue for long hours, waiting for rafts to ferry them across the river. Trucks and other larger, heavy vehicles traveling between Calang and Banda Aceh were forced to use the long and arduous Geumpang route.



*Lageun, Pante Klyon: Although Aceh's monsoon season usually ends in February or March, May 2009 saw five successive days of heavy rain caused severe flooding across much of Aceh. The force of the water rushing down rivers broke through levee banks, destroyed estuary and harbor embankments, and swept away bridges. Some 18 kms north of Calang, a sand embankment supporting a newly erected Bailey bridge was washed away, almost taking the bridge with it.*

At the time of the April collapse, USAID contractor PT SSangyong was widely commended for its speedy response in establishing a make-shift crossing. Built from the project's concrete piles, the temporary crossing proved invaluable for the driving public during the week required by the army to put up the new Bailey. \*



*Lageun, Pante Klyon: Using large boulders as reinforcement, USAID contractor PT Ssangyong prevented a newly erected Bailey bridge from being washed away after surging waters had burst through the dirt road that served as the bridge's southern abutment.*

However, Ssangyong's crossing, although perfectly safe in normal conditions, was never intended for long-term public use, and it too was brushed aside by the river's barrage of water that arrived so unexpectedly in May. Nevertheless, as in April, once again Ssangyong responded rapidly to the emergency.

One of the first measures it took was to bring in some heavy equipment to place large rocks around the exposed Bailey to protect it from the still surging river. It then removed the debris from its first temporary crossing and built a new one further downstream.

As with April's temporary crossing, this is a makeshift response while the new Bailey bridge is fully restored and starts functioning again. But as temporary and makeshift as it may be, it will be of enormous benefit to the local population, saving the driving public from hours of lost time waiting for rafts to



*Lageun, Pante Klyon: With the same efficiency and professionalism it demonstrated in April, USAID contractor PT Ssangyong one again responded quickly when it heard the newly erected Bailey bridge had been severely damaged by heavy rains. A temporary crossing was established and made available to the public within 48 hours.*

ferry them across the river or by taking the longer Geumpang journey.

Once again, the USAID contractor has provided invaluable service to the community.

\*More details about the April incident can be found in the article, “Rapidly installed emergency bridge”, within the Human Interest section, [www.acehroad.org](http://www.acehroad.org)

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

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### **Appendix 4H - Human Interest Articles (Posted on Project Website)**

**Community training enhances road safety**

**(Posted 22 May 2009)**

## **Community training enhances road safety**

A layer of fog wrapped its way through the streets of Meunasah Ba'u. But the cold, cloudy morning didn't dampen the spirits of the young men attending the 10-hour training course in Occupational Health and Safety Awareness (OHSA). All arrived spot on time for the 8am start at the village hall, which just like the course itself, was funded by USAID.

Safety training receives considerable emphasis in building the new road. Obviously construction workers need to know how to work safely in a construction zone, including how to operate machinery correctly, wear the right safety gear, and how to direct traffic, among others. This training is delivered on a regular basis by the project's Safety Team.

Sometimes, too, it is important to ensure communities living close to a road while it is being constructed also receive safety training, as in places like Meunasah Ba'u.

According to USAID's Construction Management Contractor's Safety Manager, community safety training has numerous positive effects, both for the project and local residents.

"The community will have a better understanding of safety and respect the safety enforcement procedures implemented by construction staff on the project site," the Safety Manager says, "Apart from that, conducting these community courses help give the local a people a sense of 'ownership' and pride in the project. And that's good not just for safety reasons but it's also good for public relations and helping to keep construction rolling along more smoothly."

The community gladly welcomed the training course. As Romenda, the leader of a local youth group says, "We now realize how important safety is. This is new knowledge for us. It's useful too, because with the development going on in Aceh, we hope the training will increase our chances of finding a job on a construction project."

For ten hours the participants learned about general safety principles and how to apply them practically in the workplace. Training included learning how to properly use personal protection equipment and in what situations. This included the use of helmets,

gloves, safety vests, working in confined spaces, excavation practices, and the use of different types of tools.

The ten-hour course ended with an award-giving ceremony, with participants receiving a certificate saying they had completed basic level construction safety training.

Since the completion of the training in early April, Romenda's hopes of getting jobs have been realized. Already several of the graduates have gained employment at non-road construction related companies, including the La Farge cement factory. They were told that completing the safety training, and the fact they succeeded doing it in English, were both major considerations in them being offered work.



A USAID trainer shows how to wear a safety harness at training course for the local people in Meunasah Ba'u.



After the 10-hour course, participants were given certificates confirming they had completed basic level construction safety training.

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4I - Human Interest Articles (Posted on Project Website)**

**Rapidly installed emergency bridge restores traffic and wins Governor's  
praise**

**(Posted 14 May 2009)**

## **Rapidly installed emergency bridge restores traffic and wins Governor's praise**

The rapid and effective response by USAID contractor, PT SSangyong to the collapse of a temporary bridge has won the praise of the Regent (District Governor) of Aceh Jaya for quickly restoring traffic along the vital highway link between Calang and Banda Aceh.

The temporary bridge, or Bailey bridge as they are better known, was installed by the Indonesian army following the 2004 tsunami. Located approximately 18 kilometers north of Calang at the coastal village of Lageun, the Bailey bridge collapsed under the weight of a large flatbed truck carrying an excavator around midday on Thursday, April 23.

Fortunately, no one was hurt in the accident, but the incident did halt traffic for more than 24 hours. Generally, when a road is cut off, an alternative route is not too far away. This is not the case in post-tsunami Aceh, where re-building infrastructure is still far from complete.

Once the Bailey bridge had collapsed, drivers basically had two choices: sit out the time needed to fix the problem at Lageun, or take 15 or more hours crunching and bumping along the hazardous, landslide-prone Geumpang Tutut-Meulaboh road. With the prompt arrival of one of Ssangyong's field crew and their immediate start on quickly establishing an alternative crossing, most drivers chose to remain at Lageun.

According to the local daily newspaper, Serambi Indonesia, the Regent for Aceh Jaya, Azhar Abdurrahman, spoke highly of Ssangyong's endeavor and hard work in keeping traffic delays to a minimum.

According to the newspaper, the Regent initially feared more than a week would be needed to get traffic back to normal and inevitably have adverse economic and social impacts. These impacts were avoided, according to the Regent, due to "the "extremely successful and efficient way Ssangyong completed its emergency response."

As soon as Ssangyong got news of the collapse, a team was quickly on the scene, assessing what actions were needed to get the traffic flowing again. Before long, sand was trucked in and temporary but firm embankments were quickly established both sides of the waterway. Workers then placed a long, 400mm square concrete pile parallel to the waterline on each of the embankments to provide the underlying foundation for the temporary crossing. The bridge to connect the embankments was created by placing additional concrete piles lengthwise across the waterway. For a rapid, short-term response, this was a very solid construction.

The temporary crossing was finished by 8pm the following evening. It might have taken much longer if not for the support of the Indonesian army, whose soldiers helped Ssangyong with the temporary crossing while preparing to install a new Bailey bridge to replace its buckled and broken counterpart.

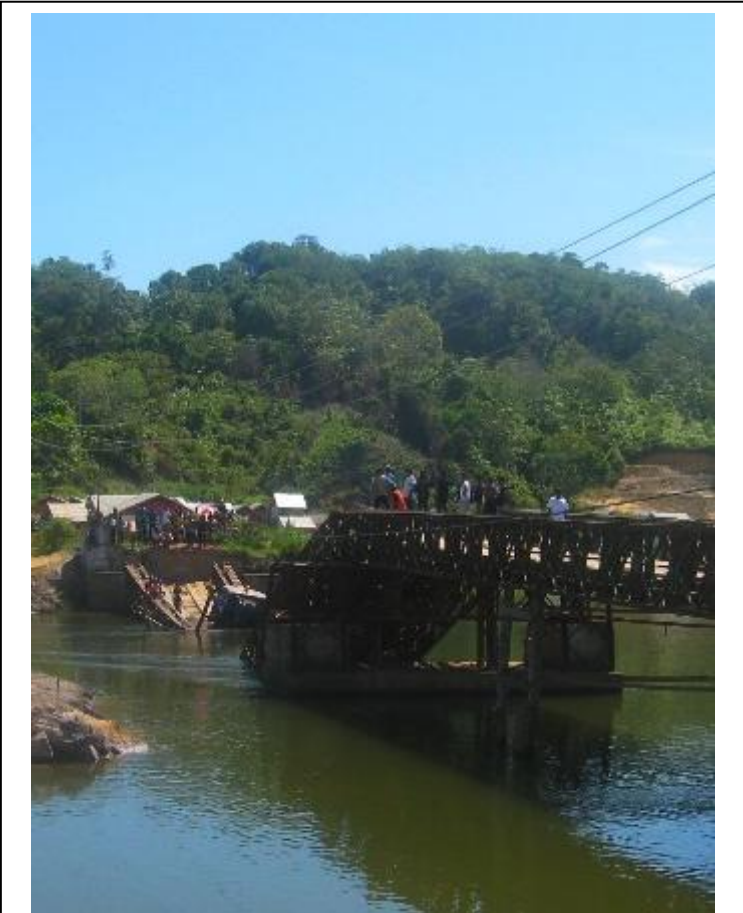
For one army officer at the scene, the collapse of the bridge did not come as a surprise, saying Bailey bridges require thorough maintenance every two years, especially if they are close to the ocean where they corrode more quickly. According to Serambi Indonesia, the Regent is also concerned about the corrosive impact of the ocean and how it may affect several other Bailey bridges in Aceh Jaya, adding that the collapsed bridge should have been replaced with a new Bailey bridge two years ago.

During the approximately 12 days required by the army to construct the new Bailey bridge, traffic used the temporary Ssangyong crossing. Once the new, 10-ton capacity Bailey bridge is operating, the Ssangyong crossing will remain open and be used for construction project vehicles. This should help improve traffic flow through the area by reducing the amount of trucks and construction equipment competing with private vehicles to use the single-lane Bailey bridge.

This is good news for the people living along Aceh's northwest coast. As the Regent said when the Ssangyong crossing was complete and the new Bailey bridge already well underway, "With the completion of the emergency bridges the trucks carrying all sorts of goods to the communities in Aceh Jaya and Aceh Barat and other areas can start moving again".

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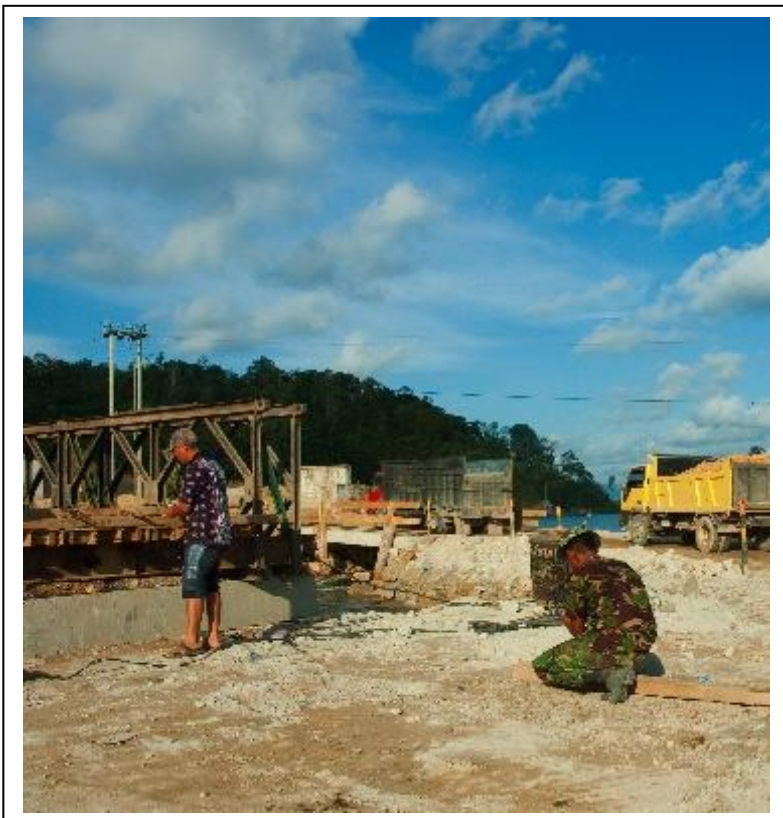
USAID contractor PT Ssangyong placed temporary soil embankments on both sides of the waterway and then created a crossing using concrete piles. This safe and speedy response to the collapse of the nearby Bailey bridge won both the praise of the local governor and the admiration of the local public.



In Lageun, some 18 km north of Calang, a temporary Bailey bridge erected just after the 2004 tsunami, collapsed on April 23 under the weight of a large truck carrying heavy equipment, severing the main artery linking Meulaboh, Calang, Lamno and Banda Aceh.



Indonesian soldiers helped Ssangyong build the temporary crossing while preparing to install a new Bailey bridge. The temporary Ssangyong crossing will be restricted to construction related traffic, thus enhancing local traffic flow by not competing with private vehicles wanting to cross the single-lane Bailey bridge.



## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

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### **Appendix 4J - Human Interest Articles (Posted on Project Website)**

**Fishing for The Future**

**(Posted 17 April 2009)**

## Fishing for The Future



Written by Public Information Team

Friday, 17 April 2009



At the western tip of Sumatra, Aceh's coastline stretches for almost 1,700 kilometers. These rich oceans abound with marine life and can produce up to 272,700 tons of fish a year.

Sadly, 800 kilometers of this coastline was ravaged beyond recognition by the 2004 tsunami. Much of the natural terrain was re-arranged and most of the coast's infrastructure was damaged or completely destroyed, including harbors, jetties, roads and bridges.

An inevitable casualty of such devastation was the local fishing industry, once a major provider of small-scale livelihoods for much of the local population. Helping local fishermen and their families restore their livelihoods requires assistance in a number of areas.

Particularly important to restoring Aceh's fishing sector will be the completion of the USAID \$240 million road and bridge project between Banda Aceh and Calang.

This is particularly true in places like Lhok Kruet, 110 kilometers west of the capital, Banda Aceh .....

The heavy nighttime rain didn't stop Lhok Kruet's fishermen from setting out to sea. When you have a family to feed you can't afford to let bad weather dampen your spirit.

Neither did the foul weather dampen the enthusiasm of the local traders, when it was still raining the next day when the fishermen returned.

They swarmed over the dock, racing one another to reach each fish-laden basket unloaded from the returning boats.

After a bit of banter and bargaining, the baskets were soon transferred to the backs of motorbikes.



Every morning at Lhok Kruet, it's the same hustle and bustle. Locals say it used to be even more frenetic, back in the days when some 55,000 people in 18 districts relied on fishing for their livelihoods.

But the tsunami changed all that. Harbors, piers, boats, buoys, jetties were destroyed or swept away.

Compounding the horror these fishing families now faced was the almost complete loss of roads and bridges they needed to reach markets. And not just local markets. But markets in Thailand, Malaysia and Singapore, the pre-tsunami destination for much of Aceh's fish exports. Without roads and bridges, these were immediately out of reach.

For Jaelani, like many of the fisherman from Lhok Kruet, fishing is no longer the livelihood it used to be. He says that might change if they had the money to buy new boats. But even new boats might not solve all their problems, says Jaleani, as traders from Banda Aceh rarely buy fish from Lhok Kruet anymore.

"Today, we only catch fish for local consumption. Before the tsunami, we sent the fish to Banda Aceh or Medan for export," Jaleani said.

Abdurrahman, a fish trader based in Banda Aceh, said that traders have stopped buying fish from Lhok Kruet because transporting fish along the tsunami ravaged roads and bridges takes too long.

Before the tsunami, Lhok Kruet was one of the main sources for Abdurrahman's fish export business. Today, however, transporting fish from Lhok Kruet to Banda Aceh is too costly.

"With the cost of fuel, the trip to Lhok Kruet is not profitable. Before the tsunami, the trip from Banda Aceh to Lhok Kruet would only take two and half hours. But now it can be more than four hours because the emergency road takes longer," Abdurrahman explained, referring to the temporary road still in use since the tsunami.

The longer route means the fish are less fresh by the time they are delivered to Banda Aceh.

Abdurrahman and Jaelani both say the completion of the Banda Aceh – Calang road will have significant benefits for them and the local community.

"If the fish can be distributed more efficiently, than our income will increase," Abdurrahman said.

Jaelani smiled in agreement. (\*)

Last Updated ( Wednesday, 27 May 2009 )

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## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4K - Human Interest Articles (Posted on Project Website)**

**A Bridge To Prosperity**

**(Posted 15 December 2008)**

## A Bridge to Prosperity

Of the 28 bridges along the 150-kilometer road under construction, the \$1.5 million Raba Bridge is of particular strategic importance. Located 16 kilometers south of the Acehnese capital of Banda Aceh, it is a key piece of infrastructure, crucial to the city's vital trade and commercial role in facilitating the province's economic development.

Four years after the devastating tsunami, commerce and industry are steadily picking up in the city of some 250,000 people. This broadly reflects Aceh's overall economic growth, which reached eight percent in 2006, according to a World Bank study released earlier this year.

While signs of this growth are not always immediately apparent in rural areas, where 30 percent of the population lives in poverty, indications of steady progress are increasingly visible at street level in the Acehnese capital. The recent emergence of traffic jams on the capital's streets seems to substantiate the World Bank's claims.

Although an unfortunate indicator of increasing local prosperity, the increasing size and number of traffic delays in the capital is a clear indicator of the importance of transport to local livelihoods.

But if these livelihoods are to grow and encourage further economic growth, the transport they rely on must be supported by good infrastructure. This particularly includes roads and bridges, such as the Raba Bridge, just a short drive down the road from Banda Aceh's economic hustle and bustle.

With such a beehive of activity so nearby, it is anticipated that traffic volume on the 80-meter Raba Bridge will exceed all other bridges now under construction in the \$254 million project.

At least this traffic will not experience the delays encountered in Banda Aceh. Already the bridge is making life easier for local road-users. Getting to the other side of the Krueng Raba river no longer requires waiting in line to cross the single-lane, emergency bridge erected after the tsunami.

The future role of the Raba Bridge was well-proven in September when its first major public use saw a convoy of heavy trucks roll across its deck and deliver a number of large kilns to the LaFarge cement factory.

This was a significant milestone in the project's progress. More importantly, given its close proximity to the capital and the cement factory, it may prove to be significant milestone in Aceh's economic and social recovery.

LaFarge is a major driving force in the Acehnese economy, not only as a provider of direct and indirect employment, but also as a supplier of the cement so vital to the construction underway in Banda Aceh and across the province.



A large vehicle makes its way across the Raba Bridge as it delivers equipment to the La Farge cement factory on the outskirts of Aceh's capital city, Banda Aceh.

The nearby presence of a safe, strong and fully functional bridge should prove to be a major fillip for the factory. The bridge will reassure LaFarge management that it now has the supporting infrastructure it needs to expand in step with the inevitable expansion in the local economy. Thus bringing jobs, well-being and, eventually, prosperity to the people of Aceh. For an investment of \$1.5 million, that's a good return.



All of the bridges on the USAID road project display two large and solid brass plaques, each carrying the USAID logo and bearing the words, "From the American People".

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4L - Human Interest Articles (Posted on Project Website)**

**A Good Road to Better Health**

**(Posted 09 December 2008)**

## **A Good Road to a Better Life**

The people in Ceunamprong village 100 kilometers west of Banda Aceh have lived in virtual isolation the past four years. Ever since the 2004 tsunami swept away the local roads and bridges, getting in and out of the village has been a tormenting experience.

And when getting out is part of an emergency trip to a hospital, it's potentially life threatening.

But those fears will soon be little more than faded memories once the \$254 million road under construction between Band Aceh and Calang is finished. The new and revitalized infrastructure USAID is funding will improve people's mobility, thus helping them to help themselves in improving their economic and social well-being.

Before the tsunami changed her world forever, 58 years old Ruslaini sold vegetables door-to-door. According to Ruslaini, traveling the 20 kilometers to the market in Lamno to buy vegetables in large quantities is near impossible on the now bumpy and dusty emergency road installed after the disaster.

"Since the road was destroyed, we have to go around the hills and cross the river by raft," Ruslaini said.

Even more disturbing for her is the worrying amount of time an emergency trip to the hospital might require. "I worry if my grandchildren suddenly get sick and have to be brought to hospital," said the vegetable-selling grandmother.

Even though a local clinic has been established, it can only handle minor medical needs.

Fitri, a midwife who has been working at the clinic for a year, understands the concerns that Ruslaini and others in Ceunamprong have about access to good health care in the event of a serious medical problem.

Earlier this year one Ceunamprong resident started bleeding heavily through the nose due to a severe case of Dengue fever. Fitri spent a frustrating and fruitless hour waiting for a public mini-bus to pass by to ferry the patient to a properly equipped hospital. She eventually borrowed a car belonging to one of the workers on the road project who happened to live nearby. Four hours later she reached Aceh's capital, Banda Aceh, and the patient received the care needed to survive.

Fitri would have used the community ambulance, but it was out of action, broken down from too many bumpy trips down the emergency road. And while five hours is a long time for a medical evacuation, the truth is that it would have been considerably longer if not for the work already done along large sections of the road.

Fitri says the lack of a good road is also a major concern for women during pregnancy. She's qualified to say this, not simply because she is a nurse. Fitri recently gave birth and knows personally the concerns pregnant women feel each

time a violent jolt ricochets up from the bumpy road beneath them. Many women prefer to give birth at home, rather than brave a trip along the crumbling, potholed road to the health centre. Some are so reluctant to make the trip that without the house calls Fitri makes they would not receive any health care for the duration of their pregnancy.

Before Fitri came to Ceunamprong, local resident Yaya said she chose to move away from the village before her three year old son was born because traveling to the doctor in Lamno for regular check-ups jeopardized her unborn baby's health.

"There is no maternity hospital in Ceunamprong and Fitri was not here yet," Yaya said, "The bumps along the emergency road are not safe for pregnant woman. They could shake you up and cause you to give birth."

Ruslaini, Fitri and Yaya all say they feel very grateful to the American people for rebuilding the Banda Aceh – Calang road.

They are already planning what to do once the road is complete. For Ruslaini, selling vegetables again is the main aim. For Fitri, the plan is to improve local community health services. And for Yaya, who still lives in Lamno, the hope is to visit her family more often in Ceunamprong.



Health services are gradually being restored for the people of Aceh as new clinics such as this one in Ceunamprong are built and the road between Banda Aceh and Calang increasingly comes on-line.



Fitri, Ceunamprong's midwife, says the new road will make it much safer for pregnant women to travel to the local health clinic.

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4M - Human Interest Articles (Posted on Project Website)**

**The Bailey...A Bridge Over Stormy Waters**

**(Posted 31 October 2008)**

## THE BAILEY .... A BRIDGE OVER STORMY WATERS

Bridges like the one in the accompanying picture are a fairly common sight between Banda Aceh and Calang. Known as a Bailey bridge, the temporary structure has a distinguished history of serving military and civil contractors during times of war and natural disaster.

They have been vital to Indonesian and international efforts to rebuild Aceh following the 2004 tsunami. This particularly true on the USAID Road and Bridge Reconstruction and Rehabilitation Project



Temporary bailey bridges like the one above near Calang save trucks from hauling materials long distances, making them essential to the timely completion of the project.

Such was the massive force of the earthquake and ensuing tsunami on Boxing Day 2004 that almost all the bridges on Aceh's northwest coast were either swept away or destroyed beyond use. Four years later many of these have been rebuilt and are in daily use. Some of the 28 in total are still at their early stages in this \$254 million, multi-year project from USAID.

In the meantime, 22 Bailey bridges have been used at various locations and at various times along the 150-kilometer road.

Responsibility for the bridges is shared between the government authorities and project contractors, should they decided to use them to access the project during construction.

Although they are limited in the size and weight of the vehicles they can carry, and how far they can span, the Bailey bridges have played a major role in the gargantuan task of rebuilding Aceh's infrastructure and getting life back to normal.

They get their name from Sir Donald Bailey, of Britain's Royal Engineers, who designed the bridge in 1940 to accommodate a new and much heavier class of tanks developed just prior to World War II.

The beauty of the Bailey bridge is not in its appearance, which is probably its least attractive feature. The beauty is in their ease of assembly. Made of pre-fabricated trusses, it can be carried in trucks and erected without using special tools and, often, without need of heavy equipment.

While they can be installed using a crane, it's the fact they can be simply launched by a team of engineers from one side of a crossing in a cantilever approach that makes them an engineering stock-in-trade during emergencies such as war and disaster recovery.

General Dwight D. Eisenhower is reported to have described the Bailey bridge as one of

the three most important technological and engineering developments of World War II, along with the heavy bomber and radar.

The Bailey bridge has had a great history of serving people's needs, during times of war and peace, and after natural disasters. This has clearly been the case in Aceh too. They will not be here forever. USAID's bridges are surely and safely coming online. Like the pain from the recent conflict and the tragedy of the tsunami, Aceh's Bailey bridges will also become a thing of the past.

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

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### **Appendix 4N - Human Interest Articles (Posted on Project Website)**

**A Safe Road**

**(Posted 24 October 2008)**

## USAID ATTENDS TO SAFETY

### Flagging Training

*There's more to building a road than the putting up bridges and laying down asphalt. It's also about caring for people's welfare. That's why the Safety Team on the USAID road and bridge reconstruction project is training staff in how to better manage traffic passing through construction zones.*

The safety of construction workers and road users is of paramount importance. Precautions need to be exercised at all times to reduce the risk of injury to people and damage to property. This is particularly important around road construction zones, where a range of unfamiliar and changing road conditions is potentially hazardous to passing traffic.

Site staff guiding traffic through a dust-filled or rain-swept obstacle course of reversing trucks and gravel surfaces need to act decisively and clearly in communicating with drivers. And best the way to do this is still through the old and ancient skill of semaphore. Or, in simple terms, flagging: the safety management practice of directing traffic around construction areas with the aid of a flag.

#### Flagger training:

On the USAID project in Aceh, flagging drivers with clear instructions is crucial in areas such as Paro and Geurute Mountains where tight curves in the winding road restrict the driver's sight line. But even in less challenging locations, site staff must be able to give clear and strong directions to drivers.



*Project staffs learn how to ensure greater driver safety through precise and clear flagging*

This is especially true in a “driver culture” that seems uninformed or even dismissive of the need to adjust driving behavior when entering construction areas. Improved flagging can encourage drivers to comply with driving speeds and other requirements where construction is occurring. Over time this may help the broader public better appreciate the need for more caution near work areas. However, the Safety Team agrees the training of site staff would work better if supplemented by a broader public awareness program, such as a government sponsored campaign.

The Safety Team has conducted flagger training on several occasions in recent months for contractor staff. These were held at various site locations, such as the contractor’s base camp in Janthang village, close to Krueng Kalla Bridge, in Aceh Besar. Training participants included field engineers, who received essential technical advice and best practice guidelines on traffic control.



*Getting drivers to slow down for construction zones requires clear and firm directions from project staff. It also requires the public’s willingness to comply.*

With this training now under their belts and a proven technique to assist them, flaggers will perform more consistently and with greater authority. This will help drivers become more accustomed to what is required of them. That in turn will lead to greater safety as well as increasingly greater public appreciation of the important role flaggers play. It will also contribute to greater efficiency and help ensure the project is completed safely and efficiently and delivers its full benefit to the people of Aceh in a timely manner.



## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4O - Human Interest Articles (Posted on Project Website)**

**USAID Ensures Quality**

**(Posted 07 October 2008)**

## USAID ENSURES QUALITY

*Completing the reconstruction of Banda Aceh – Calang road quickly for the benefit of Aceh's communities is a must, but quality cannot be sacrificed.*

The reconstruction of the USAID funded Banda Aceh – Calang road follows both U. S. and international standard specifications, thus ensuring quality control measures is critical. A set of systematic procedures is developed and implemented to ensure that the road constructed adheres to a defined set of quality criteria and meets the specifications. This includes monitoring the construction process and pre-testing materials used to build the road, embankment and bridges. Such measures are crucial to building a safe, durable and high-quality highway.



*A quality control engineer inspects the quality of gravel used to make the embankment and concrete.*



*A laboratory worker weighs the gravel prior to testing.*

Roads require a stable foundation to be built on. It must offer excellent bearing capacity, be capable of withstanding a broad range of different climatic conditions, and remain functional over several decades.

A high standard of soil compaction in an embankment is mandatory to support a strong road. Since compaction is a process of packing more solids into a given space, the physical features of the solids, which assist or resist the packing process are of primary importance. This is why the grading and moisture of soils and gravels are monitored.



*An engineer examines the embankment's density using a nuclear densitometer.*

Asphalt paving and compaction is the final procedure in road construction. Paving and compaction aims at producing a road surface of maximum regularity and skid resistance, and at creating a permanent bond between the various asphalt layers. Therefore the asphalt should meet standard specifications of density and stability. Asphalt paving also requires an exceptionally high degree of meticulous logistical planning and management. Care needs to be taken that sufficient quantities of mix are available on site all the time, and that the mix will not cool down prematurely. Monitoring and supervising needed in the Asphalt Mixing Plant to ensure the quality outcome.



*Asphalt plugs are removed from the road for examination.*



*A laboratory worker weighs the asphalt before checking its density and stability.*

The process is not likely easy without challenges. Particularly dealing with the suppliers. However efforts have been put to build a safe and comfortable road for the benefit of Aceh people.



*The asphalt mixing plant at base-camp I Jantang village, Aceh, produces asphalt for the section of road being built by the prime contractor, PT Hutama Karya.*

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4P - Human Interest Articles (Posted on Project Website)**

**Building Bridge To The Future**

**(Posted 07 April 2008)**

## Building Bridges to the Future

As the Acehnese sun falls slowly towards the horizon, a tall yellow crane is still working. Slowly, its long arm swings around and carefully places the last remaining deck section of the Raba Bridge. Herlisandrasah, an official working in the nearby Lhoknga sub-district office, is watching. From where he stands, he can see debris from the old bridge, just down river, where the 2004 tsunami dumped it after ripping up the old structure and sweeping it out to sea, along with thousands of houses and so many villagers.

He looks at the crane working on its new platform, then at the billboard, which displays a rendering what the Raba Bridge will look like when it's done.

“That one-lane temporary bridge you see downstream means traffic piles up, especially on the weekends, and merchants, tourists, everyone is constantly delayed. Right after the tsunami hit, it was much worse, of course,” he says.

“The village was flooded. People had to swim across or use a boat or trek up through the hills to get their goods to market or make it back to Aceh,” he says. “When the new bridge completed, our life here will be much better again.”



The Raba Bridge is almost done - a strong two-lane structure with a pedestrian walkway, and at 80 meters, the longest single-span bridge among the 30 bridges now being built along the USAID-funded Banda Aceh-Calang Road.

Bridge-building is more challenging than it looks but in layman's terms, it goes like this: We start with the survey, followed by the design that is suitable for that location. When we're ready to start building, the first step is the foundation – pre-fabricated concrete piles are driven into the river bed, sufficiently strong that they will support the final structure. Then rebar and framework are installed and concrete is placed to form the abutments, upon which the steel truss superstructure will rest.

Once the abutments are set, coconut tree trunk supports are installed across the Raba River to support the assembly of the superstructure. Their combined strength will be needed as workers build the heavy superstructure. It weighs approximately 340 tons. (Using coconut tree trunks as supports is a unique Indonesian practice: they're strong, straight and resistant to salt, rot and insects.) The superstructure consists of triangular trusses, essentially an interconnected series of steel beams and girders. When it's finally all in place, including the pedestrian walkway, the bridge deck is paved and the bridge is ready for traffic!



Depending on the span, the bridges on the Banda Aceh – Calang Road will be steel truss or concrete girder bridges. For shorter spans (less than 33 meters), like those over the Riting, Kalla, Meunasah Cot and Pudeng Rivers, we use concrete beam bridges. The longer span bridges will be constructed with steel trusses. Some of the bridges will have a single span and some will utilize a center pier.

Herlisandrasah tells our staff that if he could tell the Americans just one thing, it would be this: you've done a good thing with your gift of this bridge. Our village business will grow again and trade along the west coast will be much easier. Then he smiles and

adds, "As for me, the new, smooth road and this bridge means it will be easier for me to drive to Meulaboh and South Aceh to see my family. I'll be able to see my family in Meulaboh and South Aceh more often."

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4Q - Human Interest Articles (Posted on Project Website)**

**It Takes Team To Build A Road**

**(Posted 07 April 2008)**

## It Takes a Team to Build a Road

To build the Banda Aceh - Calang road, teamwork among engineer, environmental team and outreach team is essentially needed.

Reconstructing the road that linked Banda Aceh to Calang before the 2004 tsunami - USAID's signature project in Aceh - is a complex engineering challenge but the seasoned team of specialists that is undertaking the task can already claim significant progress. Made up of some of the best engineering talent - from design to construction management - that includes specialist in disciplines such as civil engineering, structural



*Inspectors monitor erection of a girder at Kalla Bridge  
(Km 45+240 – Section 3*

engineering, materials/quality assurance, cost control, scheduling, surveying, safety, social outreach, environmental and communications personnel, the team is working hand and hand to ensure success. The goal of our team is to ensure the construction of a quality facility but also to transfer to the local engineering community, which was devastated by the tsunami, a better understanding and appreciation of international specifications and construction procedures. Our team has worked together from Day 1, when the project was in its design stage; they'll continue together until the road is completed and fully opened to traffic.

In a multicultural environment, especially where language may be a barrier, smooth collaboration is essential, as is good communication within the team and with the surrounding community. On a daily basis, and with USAID's support, our team of specialists strives to share information and find solutions to potential challenges with the full participation, support and understanding of those who work and live alongside the road.



*USAID's Roy Ventura, engineers and outreach staffs  
meet with community group*

Every morning, a team of Indonesian civil, structural and materials engineers, together with inspectors, issue the directives for that day's inspection plan. Ready with their day's assignment, a civil engineering inspector, a materials technician and a surveyor head off down the road where together, they'll assess progress and return to file the requisite report, based on their visit, and earlier baseline and contractor reports. Because the local contractors often schedule concrete placements at night, the team may need to watch that process and take samples so their "day trips" often turn into late night work sessions. When that happens, they may stay overnight at one of the base camps, checking in with local technicians, and returning the following day. Such teamwork pays off and helps both communities and road workers alike to resolve issues before they become serious problems.

Take one instance in the Pulot area: USAID recognized that the villagers would need a sloping access road to deal with the height differential between the new road and the village itself. The project team determined the best design and location and our outreach staff shared the plans with the community, thereby allaying potential concern. In the process, they helped a grateful community that didn't have the means to do it themselves.

Meanwhile, our field staff is on the job, and in coordination with USAID, ensures that the work is up to standard. Trained in U.S. quality control practices and standards, they certify the completion of work only after a series of inspections have taken place and all inspectors and supervisors, from the Indonesian assistant resident engineer to the project's chief resident engineer have signed off. Other specialists that are required to sign-off on inspections include the inspectors, surveyors, laboratory technicians,



*The Environmental team meets with community representative*

materials engineers, structural engineers and quantity surveyors. With U.S. taxpayers' dollars supporting this project, we want to be sure our work meets required standards and we can prove it.

The environmental team, also critical to the project's success, works with the engineers to mitigate any environmental impacts - for example,

seeing that silt fences are installed to prevent sedimentation that results from normal construction work as well as the turbidity curtains that protect aquatic life. They also monitor the performance of the contractors to help ensure environmental compliance with contract requirements and are prepared with solutions to possible unexpected impacts.

Engineers, surveyors, monitors, environmental and outreach specialists, in coordination with USAID and with the participation and support of community groups and official stakeholders – we're all working together to achieve the same goal: building a top quality road.

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4R - Human Interest Articles (Posted on Project Website)**

**The Pudeng Saddle**

**(Posted 07 April 2008)**

## The Pudeng Saddle

The old road near Pudeng, Aceh ran next to the beach, a long stretch of pavement close to the Indian Ocean that was swept away by the 2004 tsunami. The temporary road that runs adjacent to the beach is often flooded by overtopping waves and when wet, can be difficult for heavy trucks and two-wheel drive vehicles to drive. So when designers for the new road began their work, they knew its alignment would have to go inland along higher ground.



*The original Pudeng Saddle, site of the proposed cut for the new road alignment*

But Pudeng is a hilly region, mostly hard, feldspar rock and thick jungle. To ensure that the new road was both as straight as possible and on safer, higher ground, the designers found there was only one option – our engineers would have to blast through the Pudeng Saddle, a low point between adjacent hills, and carefully remove and reshape the hard rock obstructing the proposed alignment.



*The rock at Pudeng Saddle is hard. Blasting is required.*

The road is moving forward again! After successful blasting/drilling operations, the Saddle was breached. The rocky rubble is being cleared and the first steps in constructing the new road are underway.



*The Saddle has been breached. The road will soon be constructed.*

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
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**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4S - Human Interest Articles (Posted on Project Website)**

**Marzuki and his Small Restaurant**

**(Posted 06 March 2008)**

## MARZUKI AND HIS SMALL RESTAURANT



*Marzuki's restaurant*

to the small restaurants that have been established along the road and at the work sites. One of the most popular restaurants is owned by Marzuki, located in Cot Jeumpa village, Lhoong sub-district, 40 kilometers to the west of Banda Aceh on the USAID-funded Aceh Road construction project.

That sunny afternoon, as usual, Marzuki's restaurant was crowded. Ani (30 years old), his wife, was preparing takeaway food for a long line of construction workers who are now regular customers of his restaurant. At the same time, Marzuki was serving customers eating in the restaurant. Marzuki's restaurant is one of the small



*Ani, Marzuki's wife serving customer*

As the sun rose to its zenith it was a sign that it was time to break for lunch for the road construction workers. The day was, as usual, hot. The workers started walking

businesses that benefited greatly from the Banda Aceh – Calang road reconstruction project. Marzuki said that since the reconstruction project began, the number of regular customers has increased. "Prior to

road reconstruction project, my only customers were from the neighborhood. Now, many construction and humanitarian workers are eating here,” said Marzuki who has been running his restaurant since 1998.



*Marzuki preparing food for construction worker*

Despite the fact that Cot Jeumpa village was not directly hit by the tsunami the impacts are still felt. Marzuki admitted that since the old road was destroyed by the

tsunami, it is more difficult to buy stock and get it delivered. It is not only Marzuki’s experience but most communities along west the coast face these challenges. “Actually it is cheaper to shop in Banda but now the transportation is difficult and rather expensive. So we have to wait for the retailers from Banda to come to see us so we can order and they can deliver the goods, though it’s more expensive,” said this 39 year old man.

Marzuki is grateful for the reconstruction of the road. “This road is vital for us because this road is the only access to Banda Aceh,” stated Marzuki. He hopes that the people’s mobility will increase as the road construction along west coast area is completed. “Hopefully it will also boost the economy,” were his parting comments as he went back to serving hungry construction workers.

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## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4T - Human Interest Articles (Posted on Project Website)**

**Blasting Our Way Through To A New Road**

**(Posted 06 March 2008)**

## Blasting Our Way Through To A New Road

As our team moves ahead with the Aceh-Calang road, an integral part of road construction, “blasting” is implemented. “Blasting,” is a technique necessary in hilly or mountainous regions where the only option in constructing the road is drilling through obstructive hard rock and using explosives to dislodge this rock. “Blasting” is one of the costliest of earthworks operations, but leaving cost aside, it is one of the most dangerous of the earthworks operations.

To understand the dangers, one needs to grasp exactly what this technique entails. Lets’ use a hypothetical situation, for example the road alignment is directly on the path of a steep rocky incline. The incline is too steep to construct a road over it and the rock formation is too hard to remove with excavators. The alternative then becomes either to tunnel through the impasse, or remove portions of the incline to make road construction over the incline possible. Only well coordinated drilling and the subsequent “blasting” are going to make this road viable. To those in the trade “blasting” is somewhat of an art. With talented engineers, massive rock formations can be removed with incredible precision. By the same token, carelessness or failure to adhere to procedure can be disastrous – and deadly. This slow and arduous procedure must be very carefully planned, coordinated, and monitored at every step of the way to ensure not only that the end result is achieved, but above all, that construction workers and the surrounding communities are in no way placed in harm. This seems like a tall order, but safety issues have none other than highest priority at “blasting” sites. The first step in preparation for blasting is drilling a series of holes in the rock where the explosives will be placed. The pre-determined depth and pattern of the holes will vary according to desired strength of the blast and the mass of rock to be removed.

For smaller, surgical blasts have less potential for noise, flying debris and dust. Once the boreholes have been drilled they are packed with explosives. The drilling usually occurs on Day 1, while the packing of explosives and subsequent detonation occurs on the following day. A major part of blasting preparation involves informing the communities about the procedure. This is done in two stages – community socialization meetings and signage in the respective communities. In order to keep communities along the road alignment well informed of the blasting schedule, and to ensure community safety, USAID conducts socialization meetings with affected communities. In these socialization meetings USAID and the contractor explain to communities what to expect when blastings are conducted and what safety measures should be adhered to. Communities are reassured that the procedure is safe yet it is crucial that they are aware that they should stay away from the site during the blasting schedule. Prior to the blasting the area is cordoned off and a series of sirens alert the public that the blastings will occur. Even if communities are no where near the blasting site, there is always the chance that even the sound alone of the explosions can cause trauma due to the fact that much of the construction is being done in a post-conflict region and the noise can at times be misinterpreted as being associated with the conflict.

The blasting area is very closely monitored with no one - neither construction workers nor the public allowed within 500 meters of the blasting. While every possible security measure is taken, there is always the danger of flying rocks and even unwanted explosions due to faulty materials. No chances are taken and the security and safety of everyone remains a top priority.

Affected communities appreciate the participatory approach taken by USAID and the contractor in informing them of the procedure. The socialization meetings in particular provide a venue for community members to voice their concerns and enquire how blasting will affect them, These meetings explain the necessity of blasting and reinforce that the procedure is safe when precautions are adhered to. Recently meetings were held in Lamno and as articulated by Said, the village leader “this dialogue shows a positive initiative from the contractor and USAID to involve the community in this project. We appreciated this meeting because we didn’t have any knowledge of blasting before.” These meetings are extremely useful in dispelling any confusion about blasting and reinforcing the necessity for safety measures.

Wahyu, a villager in Lamno shared Said’s sentiments about the socialization meetings in stating “I think the information provided by USAID and the contractor has been clear and comprehensive, I appreciate the information and now I am not worried about the blasting.”

It is important to stress that socialization meetings and raising public awareness of blasting is a continuous operation. Once people become comfortable with blasting the risk of complacency and failure to adhere to safety procedures can always arise. Safety is above all paramount in this operation and our affected communities can be well assured that USAID and the contractor take this operation with the up most diligence to safety and the protection of our communities.

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4U - Human Interest Articles (Posted on Project Website)**

**Banda Aceh to Calang Connection Vital for Livelihoods**

**(From Project Bulletin Dated June 2006)**

# Peuna Haba?

NEWS FROM THE BANDA ACEH - MEULABOH ROAD PROJECT



**USAID | INDONESIA**  
FROM THE AMERICAN PEOPLE



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SEDIMENTATION/SILT TRAPS



## **BANDA ACEH TO MEULABOH CONNECTION VITAL FOR LIVELIHOODS**

**HUBUNGAN BANDA ACEH - MEULABOH  
VITAL BAGI MATAPENCAHARIAN**

Editor-in-chief  
**Alexa Hergesell**

Editorial Advisors  
**Jeff Borda, Bob Dakan**

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# USAID BANDA ACEH TO MEULABOH ROAD/BRIDGE RECONSTRUCTION & REHABILITATION PROJECT UPDATE

# UPDATE PROYEK REKONSTRUKSI & REHABILITASI JALAN/JEMBATAN BANDA ACEH KE MEULABOH USAID

In partnership with the Government of Indonesia, USAID is reconstructing and rehabilitating the highway linking Banda Aceh to Meulaboh on the west coast of Aceh. This road will span approximately 240 km, and is estimated to be completed by September 2009, at a cost of \$245 million. The Parsons Corporation, a U.S. engineering and construction firm, is leading the design and construction management, while Indonesian firm Wijaya Karya (WIKA) is tasked with rehabilitating and constructing various critical sections (approximately 40 kilometers) of road between Banda Aceh and just to the south of Lamno as a priority activity. IRG, a U.S. professional services firm, has been selected to oversee environmental, community outreach and public information initiatives.

## ROAD PROJECT UPDATE

- Alignment from Banda Aceh to Calang is set: The road alignment between Banda Aceh and Calang was approved during the June 14, 2006 meeting of the Project's Technical Steering Committee, which includes representatives of the Government of Indonesia, USAID, provincial government, and implementing partners.
- Final alignment presented in public forum: The alignment and right-of-way were presented to the public in a forum held on June 29, 2006 in Banda Aceh. The forum was led by BRR (Badan Rekonstruksi dan Rehabilitasi) in cooperation with USAID and included approximately 75 stakeholders, including members of the NGO community, local and provincial government, and USAID partners. Please see the attached alignment map.
- Solicitation for primary construction contract moving ahead on schedule: The solicitation of the primary road construction contract began on schedule June 10, 2006. The full text of the



Bermitra dengan Pemerintah Indonesia, USAID tengah melakukan rekonstruksi dan rehabilitasi terhadap jalan raya yang menghubungkan Banda Aceh dengan Meulaboh di pantai barat Aceh. Jalan tersebut sepanjang 240 km, dan diperkirakan selesai pada bulan September 2009 dengan biaya AS\$245 juta. Perusahaan jasa teknik dan konstruksi AS, Parsons Corporation, memimpin pengelolaan desain dan konstruksi, sementara perusahaan Indonesia Wijaya Karya (WIKA) ditugaskan melaksanakan rehabilitasi dan rekonstruksi beberapa ruas penting (kurang lebih dengan panjang 40 kilometer) pada jalan antara Banda Aceh dan Lamno bagian selatan, sebagai kegiatan prioritas. Perusahaan jasa profesional dari AS, IRG, dipilih untuk mengawasi pelaksanaan dibidang lingkungan, penjangkauan masyarakat, dan informasi publik.

## UPDATE PROYEK JALAN

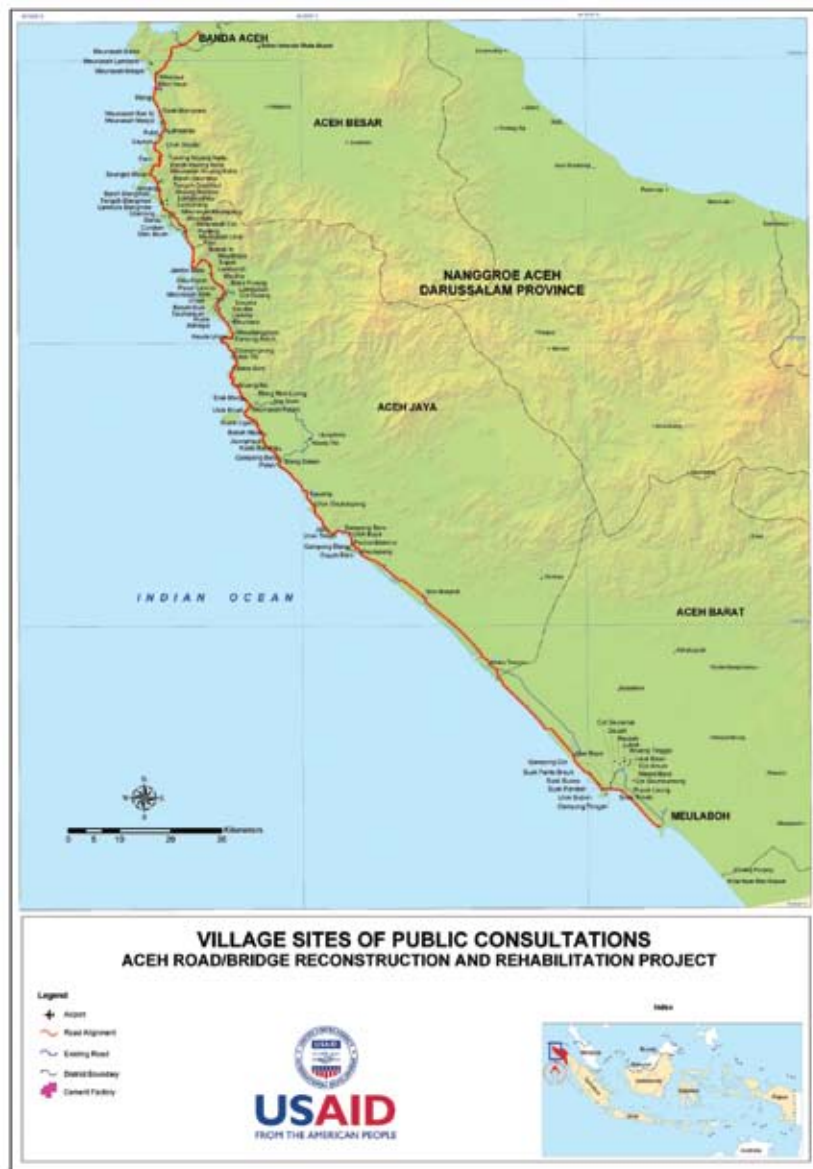
\* Penentuan Lintasan Jalan Banda Aceh - Calang final: Lintasan jalan Banda Aceh - Calang disetujui pada pertemuan Komite Pengarah Tehnik Proyek tanggal 14 Juni 2006, yang antara lain termasuk wakil-wakil dari Pemerintah Indonesia, USAID, pemerintah daerah, dan mitra-mitra pelaksana.

solicitation document (USAID Solicitation No.Indonesia-RFP-06-015) can be reviewed on the Federal Business Opportunities website ([www.fedbizopps.gov](http://www.fedbizopps.gov)).

- Pre-bid meeting held: To launch the solicitation process, USAID held a pre-bid meeting in Banda Aceh on June 28, 2006. The purpose of the meeting was to present to prospective bidders an overview of the project, clarify the scope of work, provide site specific information, answer questions, and distribute the updated design and specifications. Proposals are due on July 28, 2006. The primary contract is on track to be awarded in September 2006. The company selected is expected to maximize use of Indonesian manpower, with priority given to Acehese employees.
- USAID and JICS to cooperate on Calang – Meulaboh segment: On June 5, 2006 a meeting was held with Bina Marga (the Indonesian Department of Highways) to resolve the assignment of responsibilities for USAID and the Japan International Cooperation System (JICS) for the alignment between Calang and Meulaboh. The result of this meeting was the decision that JICS will continue and complete their agreement with the GOI, while USAID will provide selective connecting links along the route. Specifically, USAID plans to build a straight route across the marsh region for inclusion in the national highway.

## ENVIRONMENTAL MANAGEMENT UPDATE

- University Partnership: The environmental team plans to employ a team from the Environmental Research Center team of Syiah Kuala University to monitor road construction activities in the Raba River area and other areas maintained by PT Wijaya Karya (WIKA). The environmental team recently met with the university team to discuss



the final statement of work (SOW) for this monitoring project.

- Primary contract to include environmental commitments: Project environmental leaders prepared cost proposals and specifications for environmental management measures such as silt fences, sand dune channels and erosion control measures for inclusion in the primary contract.

## COMMUNITY OUTREACH UPDATE

- Village list revised in support of GOI process: The community outreach team continues to travel the 120 villages near the alignment keeping them informed of the progress of the road. The list of villages along the alignment has been updated for use in facilitating the Government of Indonesia's right of way acquisition process.
- Consultation preparation: As a result of meeting district and sub district officials the team continued preparations for the second round of community consultations in coordination with BRR and BPN.
- NGO project database: The outreach team is also working to update a database of NGO projects located along the alignment.

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- Penentuan final lintasan jalan dipaparkan kepada publik: Penentuan lintasan jalan serta ruang milik jalan telah dipaparkan kepada publik dalam suatu forum yang digelar pada 29 Juni 2006 di Banda Aceh. Forum tersebut dipimpin oleh Badan Rekonstruksi dan Rehabilitasi (BRR) bekerja sama dengan USAID dan mencakup kurang lebih 75 pemegang kepentingan (stakeholder), termasuk anggota komunitas organisasi non pemerintah (LSM), pemda dan pemerintah propinsi, serta mitra-mitra USAID. Lihat peta penentuan lintasan jalan terlampir.
- Proses penawaran kontrak kerja konstruksi utama berjalan tepat waktu: Proses pengajuan penawaran kontrak kerja konstruksi jalan utama dimulai tepat waktu pada tanggal 10 Juni 2006. Dokumen lengkap proses penawaran tersebut (USAID Solicitation No.Indonesia-RFP-06-015) dapat diteliti pada situs internet Federal Business Opportunities ([www.fedbizopps.gov](http://www.fedbizopps.gov)).
- Acara pralelang digelar: Guna menyelenggarakan proses pengajuan penawaran, USAID menggelar acara pralelang di Banda Aceh pada tanggal 28 Juni 2006. Acara tersebut dimaksudkan untuk memaparkan kepada calon peserta lelang gambaran umum proyek, menjelaskan lingkup pekerjaan, menjawab pertanyaan, serta membagikan rancangan dan spesifikasi yang telah diperbaharui. Sesuai jadwal, kontrak utama akan ditetapkan pada bulan September 2006. Perusahaan yang dipilih diharapkan dapat memaksimalkan pemanfaatan tenaga kerja Indonesia, dengan prioritas untuk pegawai dari Aceh.
- Kerjasama USAID dan JICS pada segmen Calang - Meulaboh: Pada tanggal 5 Juni 2006 telah diselenggarakan pertemuan dengan Bina Marga untuk menyelesaikan pembagian penugasan pada lintasan jalan Calang-Meulaboh antara USAID dan Japan International Cooperation System (JICS). Hasil



dari pertemuan tersebut, disepakati adanya satu lintasan jalan yang pengerjaannya diselesaikan oleh JICS. Pada pertemuan tersebut juga telah disepakati beberapa aspek teknis pekerjaan termasuk keputusan untuk tidak melebarkan jalan JICS. Rancangan akhir ruas tersebut diharapkan rampung pada Desember 2006.

## UPDATE PENGELOLAAN LINGKUNGAN HIDUP

- Kemitraan bersama Perguruan Tinggi: Rencananya tim lingkungan hidup akan menugaskan tim dari Pusat Penelitian Lingkungan Hidup Universitas Syiah Kuala untuk memantau kegiatan konstruksi jalan di wilayah Sungai Raba dan wilayah lain dalam pemeliharaan PT Wijaya Karya (WIKA). Belum lama berselang, tim lingkungan hidup bertemu dengan tim universitas untuk membahas Pernyataan Akhir Pekerjaan (final statement of work / SOW) bagi proyek pemantauan tersebut.
- Kontrak utama akan mencakup komitmen lingkungan hidup: Pimpinan proyek lingkungan hidup telah menyiapkan daftar biaya dan spesifikasi untuk berbagai kegiatan lingkungan hidup seperti pembangunan pagar penahan lumpur dan jalur bukit pasir, serta tindakan pengendalian erosi, untuk disertakan didalam kontrak utama.

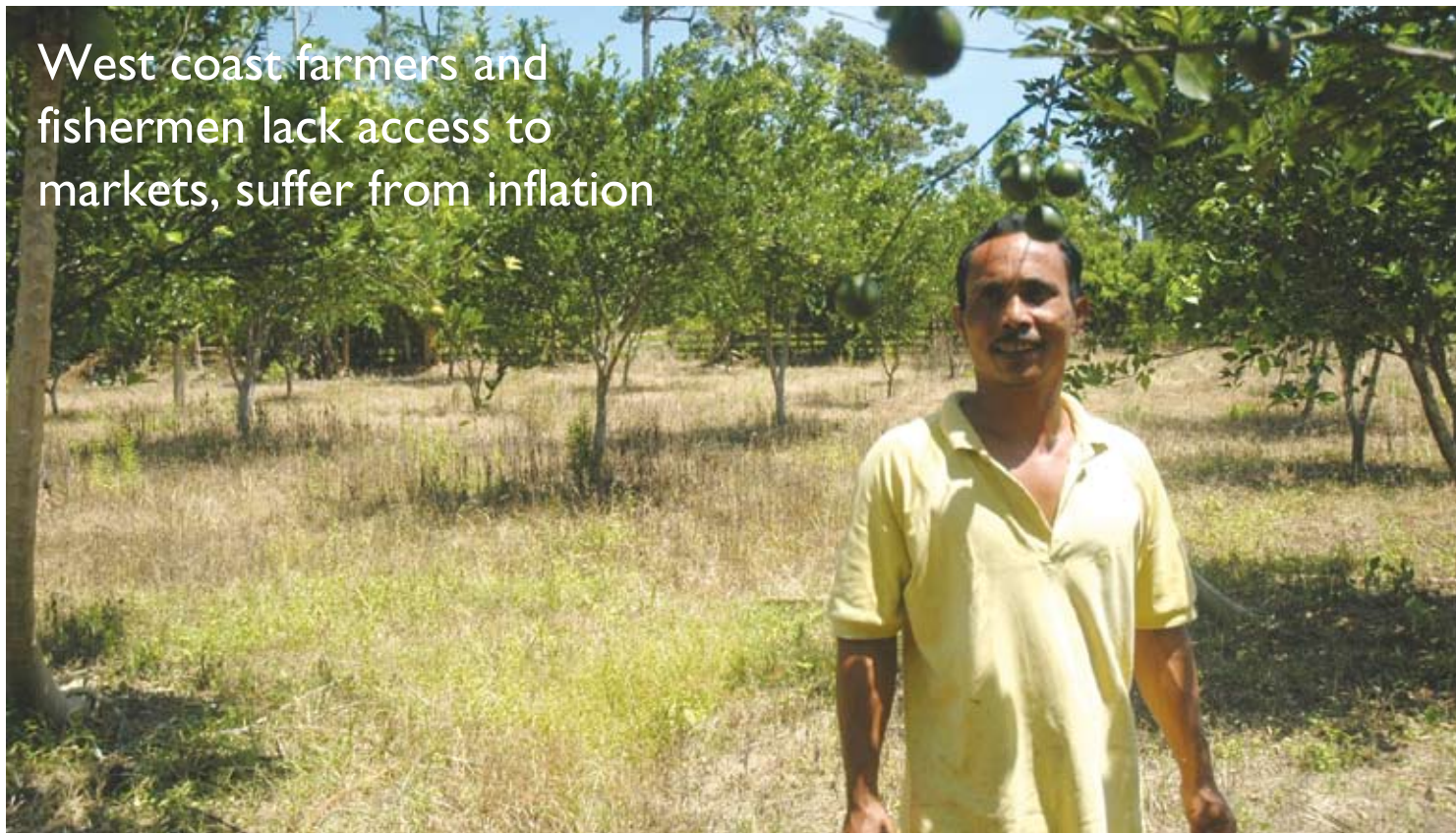
## UPDATE KEGIATAN PENJANGKAUAN MASYARAKAT

- Revisi daftar desa untuk mendukung upaya Pemerintah Indonesia: Tim penjangkauan masyarakat melanjutkan peninjauan terhadap 120 desa yang berdekatan dengan lintasan jalan guna menyampaikan berita terkini tentang kemajuan pembangunan jalan. Daftar desa sepanjang lintasan jalan tersebut telah di perbaharui untuk memfasilitasi proses pembebasan tanah yang dilakukan Pemerintah Indonesia dalam rangka ruang milik jalan.
- Persiapan musyawarah: Pertemuan tim dengan pejabat kecamatan dan kelurahan menghasilkan kelanjutan persiapan untuk putaran kedua musyawarah dengan masyarakat dibawah koordinasi BRR dan BPN.
- Basis data proyek LSM: Tim penjangkauan tengah melakukan update terhadap basis data tentang proyek-proyek LSM yang berada sepanjang lintasan jalan.

Untuk informasi proyek silakan hubungi: 0651-40278  
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# BANDA ACEH TO MEULABOH CONNECTION VITAL FOR LIVELIHOODS

West coast farmers and fishermen lack access to markets, suffer from inflation



Oleh: **Syamsul Meureudu**

**C**ommunities along Aceh's west coast, which was devastated by the December 26, 2004 tsunami, have suffered strong economic impacts, including high inflation rates and loss of livelihoods. One of the casualties of the tsunami was infrastructure, including the key 240 kilometer Banda Aceh to Meulaboh highway. The road's position was strategic in the past, functioning as the economic backbone of the west coast as well as the main connection to North Sumatra province.

During the early post-tsunami period, transportation along the road was halted and most humanitarian

workers relied on air travel to reach Meulaboh and Calang. Temporary roads have since been built, and the area is now passable, but the route remains slow and hazardous.

The lack of a functioning road has dealt a severe economic blow to local communities along the west coast. The price of daily goods climbed rapidly. Inflation has chewed away at earning power and nearly doubled the cost of living. The absence of a safe and direct connection to major cities has handicapped Acehnese farmers and fishermen marketing their local products.

Sofyan, a thirty-three year old fish seller and orange farmer

**Sofyan, 33, proudly demonstrates the fruits of his labor at his orange plantation near Calang.**

**Sofyan, 33, dengan bangga memperlihatkan kebun jeruknya di dekat Calang**

# HUBUNGAN BANDA ACEH - MEULABOH VITAL BAGI MATAPENCAHARIAN

Petani dan nelayan pantai barat tak dapat menjangkau pasar, dibebani inflasi.

Oleh: **Syamsul Meureudu**

**M**asyarakat sepanjang pantai barat Aceh yang hancur diterpa tsunami tanggal 26 Desember 2004 lalu, mengalami dampak ekonomi yang dahsyat, termasuk tingkat inflasi yang tinggi dan kehilangan mata pencarian. Salah satu kerugian akibat tsunami adalah kerusakan infrastruktur, termasuk jalan raya Banda Aceh - Meulaboh yang sangat penting dengan panjang 240 kilometer. Di masa lalu jalan tersebut posisinya strategis, dan berfungsi sebagai tulang punggung perekonomian pantai barat, selain menjadi penghubung utama dengan propinsi Sumatera Utara.

Pada awal pasca tsunami, transportasi melalui jalan tersebut terputus dan sebagian besar petugas kemanusiaan terpaksa mengandalkan angkutan udara untuk mencapai Meulaboh dan Calang. Setelah itu memang dibangun jalan darurat, dan wilayah tersebut dapat dilalui kembali, kendati dengan lambat dan berbahaya.

Hilangnya jalan yang berfungsi merupakan pukulan ekonomi yang sangat berat bagi masyarakat sepanjang pantai barat. Harga kebutuhan sehari-hari melambung tinggi. Inflasi pun telah mengikis daya beli masyarakat dan mengakibatkan kenaikan biaya hidup hampir satu kali lipat. Hilangnya hubungan yang langsung dan aman menuju kota-kota besar telah menghambat petani dan nelayan Aceh dalam memasarkan hasil buminya.

Sofyan, 33 tahun, pedagang ikan

dan petani jeruk dari desa Ujung Rimba dekat Calang, mengatakan hilangnya hubungan dengan kota-kota sekitar telah berdampak buruk pada mata pencarian warga desa. Sebagian besar warga Ujung Rimba mencari nafkah sebagai pedagang kecil ikan ataupun petani. Hasil bumi utama di wilayah Calang adalah jeruk, kelapa sawit dan kelapa.

Nelayan setempat membeli ikan dari Patek kemudian menjualnya kembali di Banda Aceh atau Meulaboh, atau di pasar-pasar kecil setempat. Di pasca tsunami, angkutan menjadi kendala besar yang menyebabkan petani dan nelayan menemui kesulitan memasarkan hasil bumi mereka ke Banda Aceh atau Meulaboh. Kendati terdapat sejumlah mobil minivan untuk mengangkut hasil bumi, namun kapasitasnya kecil dan tarifnya terlalu mahal bagi pedagang atau petani kecil. Karenanya, para pedagang tersebut melongok pasar-pasar setempat, dimana harga yang diperoleh untuk hasil bumi mereka jauh lebih rendah.

Para petani jeruk di desa Ujung Rimba yang menghasilkan panen dari 2 hingga 6 ton setiap musim pun rawan terhadap kondisi tersebut. Yang menghasilkan kurang dari 2 ton terpaksa melepaskannya kepada tengkulak atau menjualnya di pasar lokal, sedangkan yang hasilnya lebih dari 5 ton berupaya menjualnya di Banda Aceh atau Meulaboh agar memperoleh harga lebih baik - 3500 - 4000 rupiah per kilogram.

"Harga angkutan naik satu

kali lipat," ujar si penjual jeruk Sofyan, seraya mencatat bahwa keuntungannya telah berkurang. Sebelum tsunami, jelasnya, biaya mengangkut hasil buminya dari Ujung Rimba ke Banda Aceh hanya Rp.250 per kilogram, akan tetapi biaya tersebut naik menjadi Rp.500 per kilogram pasca tsunami karena truk besar tidak dapat menempuh jalan yang rusak. Karena keuntungan menurun, ia tak mampu menanam modal kembali untuk memelihara kebun jeruk miliknya. Akibatnya, tahun ini satu hektar tanaman jeruknya mengalami panen buruk. Sebagian besar buahnya mengeras dan rasanya hilang, sehingga tidak dapat dijual.

Sofyan terlihat gembira tentang kemungkinan perbaikan jalan, baik untuk alasan pribadi maupun bagi perekonomian. Menurutnya, harga angkutan yang begitu mahal menyebabkan warga setempat kini jarang melakukan perjalanan ke Banda Aceh, dan bukan saja pasar yang tak dapat mereka jangkau, bahkan juga kerabat dan keluarga.

## TEKANAN AKIBAT INFLASI

**E**rmansyah, 36 tahun, seorang pengrajin asal Calang yang saat ini tinggal dan bekerja di Banda Aceh, memprihatinkan tekanan inflasi terhadap lingkungannya. Menurutnya, semenjak jalan Banda Aceh-Meulaboh mengalami kerusakan,

in the village of Ujung Rimba near Calang, stated that lack of access to nearby cities has harmed villagers' livelihoods. Most Ujung Rimba residents make a living as small fish traders or farmers. The major agricultural products in the Calang area are oranges, palm oil and coconuts.

Local fishermen buy fish in Patek and resell them in Banda Aceh or Meulaboh, or in small local markets. Transportation has emerged as a major obstacle in the post-tsunami period, preventing farmers and fish traders from marketing their products in Banda Aceh or Meulaboh. Although some minivans are available to transport products, they can only carry a small load and the fare is prohibitively expensive for small merchants or farmers. Therefore, traders have turned to local markets, where they receive far lower prices for their goods.

Orange farmers in Ujung Rimba village, whose harvest yields are between 2 to 6 tons each season, are vulnerable to these conditions. Those who harvest less than two tons are forced to release their goods to middleman or sell at local markets, while those with yields above 5 tons try to sell their products in Banda Aceh or Meulaboh in an attempt to pursue better prices --.3500-4000 rupiah per kilogram.

"Transportation prices have doubled," orange vendor Sofyan said, noting that his profits have fallen. He explained that before the tsunami, the cost of transporting his goods from Ujung Rimba to Banda Aceh was 250 rupiah per kilogram, but it rose to 500 Rp. Per kilo post-tsunami, because large trucks have not been able to travel the damaged road. Because of the profit decline,

he is unable to put more capital into maintenance of his orange plantation. As a result, 1 hectare of his orange farms experienced a poor harvest this year. Much of the fruit hardened and became tasteless and therefore could not be sold.

Sofyan is visibly happy about the prospect of a rehabilitated road, both for economic and personal reasons. He says that because transportation is so expensive, local residents now rarely travel to Banda Aceh and have trouble reaching not just markets, but also friends and family.

### INFLATIONARY PRESSURES

**E**rmansyah, 36, a craftsman from Calang now living and working in Banda Aceh, worries about inflationary pressures in his community. He says that after the Banda Aceh-Meulaboh road was damaged, areas such as Lamno, Calang and Meulaboh have been badly hit by inflation. Goods in these areas have become more expensive prices becoming more expensive than in Banda Aceh. As he point out, before tsunami the fare for public transport from Banda Aceh was Rp.40,000 per passenger, and it has now doubled to 80,000 per passenger.

Calang has been particularly badly hit by inflation. All primary daily needs have become expensive. For example, as Erman explains, you can buy an omelet in Banda Aceh for Rp.3000, but in Calang it costs Rp.5000. People in Banda Aceh can buy a pack of noodles for Rp.3500-4000, but in Calang the average price is Rp. 5000.

It is not only food prices that have been affected. The price of

labor and building materials has risen dramatically. Additionally, fuel prices have gone up due to a damaged petrol station and lack of fuel transportation. Although the petrol station was repaired, fuel transportation remains hindered because it is difficult for fuel tank vehicles to pass over damaged roads and bridges.

"These communities are held back economically in two ways: First in the form of direct costs, because consumption has become expensive. Second, agricultural and fisheries products are difficult to market and lose competitive advantage due to expensive transportation," said Said Muhammad, the Dean of the Economic Faculty at Syiah Kuala University. However, Muhammad also sees much economic potential for west coast communities because they are rich in natural resources, such as coconuts, palm oil, oranges and fish.

Nazamuddin, an economist from Syiah Kuala University, believes that the Banda Aceh to Meulaboh road reconstruction will bring significant socio-economic benefits to local communities by decreasing inflation caused by distribution blocks. Once the road is rehabilitated, the economy of the west coast will improve rapidly.

The USAID Banda Aceh to Meulaboh road/bridge reconstruction and rehabilitation project is expected to be completed in 2009. The rehabilitated road will reduce travel time from Banda Aceh to Meulaboh to 3 to 4 hours, thus bringing new economic opportunities and revitalizing livelihoods for communities along the Aceh's west coast.

wilayah seperti Lamno, Calang dan Meulaboh terkena pukulan berat akibat inflasi. Harga barang disana menjadi lebih mahal daripada di Banda Aceh. Dicontohkannya, sebelum tsunami tarif angkutan per penumpang dari Banda Aceh adalah Rp.40.000, dan kini telah berlipat ganda menjadi Rp.80.000 per penumpang.

Calang, terutama, mengalami pukulan berat akibat inflasi. Seluruh barang pokok menjadi mahal. Misalnya, Erman menjelaskan, di Banda Aceh satu martabak telur harganya hanya Rp.3000, tetapi di Calang dijual Rp.5000. Di Banda Aceh, satu bungkus Mie dijual Rp.3500-4000, namun di Calang harganya rata-rata Rp.5000.

Bukan saja harga pangan yang terkena dampak. Upah buruh maupun harga bahan bangunan telah melonjak drastis. Selain itu, harga BBM mengalami kenaikan akibat rusaknya sebuah pom bensin dan langkanya angkutan BBM. Kendati pom bensin telah diperbaiki, angkutan BBM masih mengalami hambatan akibat sulitnya mobil tangki BBM melalui jalan dan jembatan yang rusak.

“Masyarakat tersebut menanggung dua kerugian ekonomis: Pertama, dalam bentuk biaya langsung, dengan mahalnya barang-barang konsumsi. Kedua, hasil pertanian dan hasil laut susah dipasarkan, dan kalah bersaing karena transportasi yang mahal,” ujar Dekan Fakultas Ekonomi Universitas Syiah Kuala, Said Muhammad. Namun demikian, Muhammad juga melihat ekonomi masyarakat pantai sangat berpotensi dengan kayanya sumber daya alam yang dimilikinya, seperti kelapa, kelapa sawit, jeruk dan ikan.

Nazamudin, seorang pakar ekonomi dari Universitas Syiah Kuala, menilai rekonstruksi jalan Banda Aceh - Meulaboh akan membawa manfaat sosial dan ekonomi yang signifikan bagi masyarakat setempat dengan berkurangnya inflasi yang disebabkan hambatan distribusi. Begitu jalan selesai direhab, maka perekonomian pantai barat akan meningkat pesat.

Proyek rekonstruksi dan rehabilitasi jalan/jembatan Banda Aceh - Meulaboh yang dilaksanakan USAID diharapkan selesai tahun 2009. Jalan yang direhabilitasi tersebut mampu mengurangi waktu tempuh Banda Aceh - Meulaboh menjadi 3 hingga 4 jam, dan dengan demikian menghadirkan peluang ekonomi baru serta menghidupkan kembali mata pencarian masyarakat sepanjang pantai barat Aceh.

**Fishermen in Ujung Rimba, near Calang, sell their catch.**

**Nelayan di Ujung Rimba, Calang, menjual hasil tangkapannya.**



# NEW ROAD BYPASSES DANGEROUS FERRY IN INDONESIA

By: Jeff Borda

LAMNO, Aceh.

The line to board the Lambeso River ferry is crowded, and the four-car limit makes a long wait under the Acehenese sun almost a certainty. Adul Puteh, a merchant transporting goods from a traditional market in the north to his store in Calang, stands in the shade. Patiently, he passes time talking with other drivers and smoking Kretek, the pungent Indonesian clove cigarette. “We have no choice,” says Pak Adul. “The ferry is dangerous, but without transporting my goods, I cannot feed my family.”

Pak Adul’s problem is about to be solved. In mid-April, a temporary bypass for the national road will be officially opened and the Lambeso River ferry rendered obsolete.

The bypass is part of USAID’s \$245 million plan to rebuild roads and bridges in the Western Sumatra province of Aceh, where more than

200,000 died in the December 2004 tsunami.

The usual wait of one to four hours will be shortened to a 20-minute journey; most important, the simple journey across the Lambeso will again be safe.

The tsunami that hit Indonesia, Sri Lanka, Thailand, India, the Maldives, and Somalia ripped through Aceh and destroyed much of the region’s infrastructure. Many bridges were swept away along the 240 km road from the provincial capital Banda Aceh to the trading hub of Meulaboh.

The loss of the Lambeso River Bridge interrupted commerce up and down the coast. To close this gap, a makeshift ferry to cross the Lambeso was established.

The small, floating wooden barge, made of planks, many rotting from exposure, were tied, nailed, and wedged together to form an improvised deck. The structure creaks under the weight of trucks,

cars, and people.

Men dangle from the side, and women carrying babies hang on for their lives, as the barge makes its journey from bank to bank. Fear of capsizing is on everyone’s mind. A truck has already fallen off.

Teuku Umar, a local vendor, contemplates the crossing while adjusting his intricately woven green, black, and gold topi, the tradition head cover worn by men in Aceh. He said: “Inshallah (God Willing). The ferry will safely arrive. Catastrophe is not in our hands, but in finding a better way to cross is.”

USAID Indonesian Mission Director William M. Frej said, “Reconstruction of the Banda Aceh to Meulaboh Road is progressing. This is a small, but important step forward. The road to Meulaboh is long, and the challenges are many, but the U.S. project will be completed in the anticipated three year reconstruction period.”



# JALAN BARU MENGHINDARI FERI YANG RAWAN DI INDONESIA

Oleh: **Jeff Borda**

LAMNO, Aceh,

**A**ntrian penumpang yang hendak menaiki feri Sungai Lambeso penuh, sementara berlakunya batasan empat kendaraan memastikan penumpang bakal menunggu cukup lama dibawah teriknya matahari Aceh. Adul Puteh, seorang pedagang yang tengah membawa barang dagangan dari sebuah pasar tradisional di wilayah utara menuju tokonya di Calang, berdiri di tempat yang teduh. Dengan penuh sabar, ia menghabiskan waktu dengan berbincang-bincang bersama supir lain dan menghisap rokok kretek khas Indonesia.

“Kami tak punya pilihan,” ujar Pak Adul. “Naik feri memang bahaya, tapi kalau barang tidak diangkut, saya tidak bisa kasih makan keluarga.”

Masalah yang dihadapi Pak Adul akan segera teratasi. Pertengahan bulan April, jalan bypass sementara yang memintasi jalan raya Lintas Sumatra resmi dibuka dan dengan demikian feri Sungai Lambeso bakal menjadi kadaluwarsa.

Jalan bypass tersebut merupakan bagian dari rencana USAID senilai 245 juta dolar AS untuk membangun kembali jalan dan jembatan di Propinsi Aceh, Sumatra, dimana lebih 200.000 jiwa hilang pada tsunami Desember 2004.

Waktu tunggu yang biasanya satu hingga empat jam akan disingkat menjadi perjalanan selama 20 menit; lebih penting lagi, jalan melintasi sungai Lambeso menjadi aman kembali

Tsunami yang menerpa Indonesia, Sri Lanka, Thailand, India, Kepulauan Maldive dan Somalia menghantam Aceh dan merusak sebagian besar infrastruktur di

daerah itu. Sejumlah besar jembatan sepanjang jalan 240 km dari Banda Aceh, ibukota propinsi, menuju sentra perdagangan Meulaboh, terbawa arus.

Hilangnya Jembatan Sungai Lambeso sempat mengganggu perdagangan sepanjang pantai. Agar kekosongan tersebut tertutup, dibuatlah feri sementara untuk melintasi sungai tersebut.

Tongkang kecil terapung terbuat dari papan kayu yang sebagian besar lapuk dimakan air sungai, diikat, dipaku dan disatukan hingga menjadi geladak sejadinya. Bunyi derik terdengar setiap dibebani truk, mobil, dan manusia.

Para pria bergelantungan dipinggir, sementara beberapa ibu yang menggendong anak berusaha berpegangan erat-erat saat tongkang menyusuri jalurnya dari tepian ke tepian. Semua penumpang khawatir feri akan terbalik. Bahkan satu truk sudah jatuh kedalam sungai.

Teuku Umar, seorang pedagang setempat, menimbang penyeberangan tersebut, seraya memperbaiki letak topi tenunan warna hijau, hitam dan emas, yang menjadi ciri khas pria Aceh. Tuturnya: “Insy Allah. Feri akan tiba dengan selamat. Musibah bukan ditangan kita, melainkan mencari cara yang lebih baik untuk menyeberang.”

Direktur Misi Indonesia dari USAID, William M. Frej berkata, “Rekonstruksi jalan Banda Aceh - Meulaboh tengah berjalan. Hal ini merupakan langkah maju yang kecil, namun sangat penting. Jalan menuju Meulaboh cukup panjang, dan tantangan yang dihadapi cukup banyak, akan tetapi proyek AS tersebut akan selesai dalam masa rekonstruksi yang diharapkan selama tiga tahun.”

# ENVIRONMENTAL MANAGEMENT ON THE WEST COAST ROAD: RABA RIVER SEDIMENTATION/SILT TRAPS

By: **Virza Sasmitawidjaja**

**T**he Aceh Road/Bridge Reconstruction and Rehabilitation project is expected to have a positive impact on the region's economy, but there are environmental considerations that must be carefully managed as well. The Project's environmental management team has assessed potential environmental effects and developed mitigation measures that will be incorporated into the entire road construction process.

Potential environmental effects are documented in the Project's Environmental Assessment (EA) and AMDAL (Analisis Mengenai Dampak Lingkungan). It is USAID policy to implement the measures detailed in these documents. Mr. Mufti Madjid, the head of the AMDAL Division of Nanggroe Aceh Darussalam Province BAPEDALDA stated, "The AMDAL Environmental Review Document and its Best Management Practices are singularly the best examples of environmental management for post-tsunami rehabilitation and reconstruction in Aceh Province. This demonstrates the strong commitment of USAID to prevent further environmental destruction of Aceh, which was devastated by the tsunami."

Sedimentation in bodies of water along the west coast is considered a significant hazard of road construction, as the project will build more than one hundred water crossings (e.g. bridges and culverts). Sedimentation decreases water quality and damages ecosystems. The USAID project has implemented silt traps along the Raba River in order to decrease sedimentation in this area.

The Raba River Bridge is an important site on the Banda Aceh



**Silt traps at the Raba River Bridge**  
Penangkap sedimen di Jembatan Krueng Raba

to Meulaboh road, as it spans 120 meters and is close to the capital and economic center, Banda Aceh. This site has been chosen as a location for project ceremonies and events on a number of occasions. When the earth was graded in this site, the vegetation was cleared, increasing the potential for sedimentation. The Project responded to this situation by building sedimentation/silt fences made of the locally available materials, such as bamboo and rice sacks.

The fence functions as a filter that retains the sediment and prevents it from flowing into the river. Thus, sedimentation materials are trapped in the silt fences and negative impacts on living organisms can be mitigated.

This is only one example of an environmental management measure. Throughout the USAID Aceh road construction process, many more environmental management measures will be implemented. This demonstrates a strong commitment

in carrying out AMDAL and EA prescriptions, which will be fully implemented and properly monitored.

## ENVIRONMENTAL BEST MANAGEMENT PRACTICES

**M**itigation plans to hinder sedimentation have been thoroughly stated in the EA and AMDAL.

Moreover, these measures are described in detail in the form of Best Management Practices (BMPs) in the Environmental Review Document, ERD (the complimentary document to the overall EA and AMDAL focused on particular road project segments). Some of the Best Management Practices for decreasing erosion and sedimentation include:

- Providing ditches, culverts, and other measures to mechanically retard and control runoff from the construction site, to control surface water and to protect drainage courses.
- Building dams, settling basins, and other measures, to control downstream flows. If necessary, sediment shall be trapped in temporary or permanent sediment basins.
- Covering or otherwise protecting slopes until permanent erosion-control measures are working.
- Re-vegetating slopes where vegetation was removed or destroyed during construction.
- Using erosion control barriers (concrete, filter fabric, whatever is available).

# PENGELOLAAN LINGKUNGAN PADA JALAN PANTAI BARAT: PENANGKAP SEDIMEN KRUENG RABA

Oleh: **Virza Sasmitawidjaja**

**P**royek Rehabilitasi dan Rekonstruksi Jalan/Jembatan di Aceh akan memberikan dampak positif bagi perekonomian di satu sisi, tetapi pada sisi yang lain terdapat pula pertimbangan lingkungan yang harus dikelola dengan hati-hati. Tim pengelolaan lingkungan proyek telah mengkaji potensi dampak lingkungan serta merumuskan langkah-langkah mitigasi yang akan dipadukan ke dalam seluruh proses pembangunan jalan. Potensi dampak lingkungan telah didokumentasikan ke dalam Kajian Lingkungan (Environmental Assessment, EA) dan AMDAL (Analisis Mengenai Dampak Lingkungan). Hal ini merupakan kebijakan USAID untuk menerapkan langkah-langkah yang telah diuraikan dengan rinci di dalam dokumen tersebut.

Sedimentasi pada badan air sepanjang jalan pantai barat merupakan potensi dampak penting dari pembangunan jalan, karena proyek ini akan membangun lebih dari seratus lintasan di atas air (yaitu: jembatan dan gorong-gorong). Sedimentasi menurunkan kualitas air dan mengganggu ekosistem. Proyek USAID telah membuat penangkap sedimen di Krueng Raba sebagai langkah untuk mengurangi sedimentasi pada lokasi tersebut.

Jembatan Krueng Raba merupakan salah satu lokasi yang penting dari jalan Banda Aceh ke Meulaboh, dengan bentangan sepanjang 120 meter dan jarak yang dekat dengan ibukota dan pusat kegiatan ekonomi, yaitu Banda Aceh. Lokasi ini telah dipilih sebagai tempat untuk kegiatan-kegiatan seremonial proyek. Dimana dilakukan pembersihan lahan dan vegetasinya yang meningkatkan



potensi sedimentasi. Sebagai langkah tindak lanjut dari keadaan ini, proyek membuat pagar sedimentasi dari bahan-bahan yang tersedia, seperti bambu dan karung goni.

Pagar ini berfungsi sebagai penyaring yang menahan sedimen dan mencegahnya mengalir ke sungai. Kemudian, materi sedimen tertangkap di sini dan dampak negatif pada organisme dapat ditanggulangi.

Hal ini merupakan satu contoh dari langkah pengelolaan lingkungan. Pada keseluruhan proses pembangunan jalan USAID di Aceh, akan lebih banyak lagi langkah pengelolaan lingkungan yang dilaksanakan. Hal ini menunjukkan komitmen yang kuat dalam menerapkan ketentuan-ketentuan AMDAL dan EA, yang akan dilaksanakan secara penuh dan dipantau secara memadai.

## PRAKTIK PENGELOLAAN LINGKUNGAN TERBAIK

**R**encana pengelolaan untuk mengurangi sedimentasi telah dikaji secara mendalam pada EA dan AMDAL. Lebih jauh lagi, langkah-

langkah ini dijelaskan secara rinci sebagai Praktik Pengelolaan Terbaik (atau Best Management Practices, BMP) dalam Dokumen Pengkajian Lingkungan atau Environmental Review Document, ERD (merupakan dokumen tambahan atas EA dan AMDAL yang terfokus pada segmen jalan tertentu). Beberapa Praktik Pengelolaan Terbaik untuk menurunkan erosi dan sedimentasi termasuk:

- Menyediakan saluran, tanggul, gorong-gorong, dan pencegahan lain untuk memperlambat dan mengendalikan aliran air dari lokasi konstruksi, mengendalikan air permukaan dan untuk melindungi saluran.
- Membangun dam, bak penampungan, energy dissipaters, dan upaya lainnya untuk mengontrol aliran air. Jika dibutuhkan, sedimentasi akan ditampung pada kolam sementara atau permanen.
- Tutupi atau lindungi lereng sampai upaya pengendalian erosi dilakukan.
- Menanam kembali lereng yang dibersihkan atau rusak selama konstruksi.
- Menerapkan penahan untuk mengendalikan erosi (beton, filter plastik, atau bahan lain yang tersedia).

Bapak Mufti Madjid, Kepala Bidang AMDAL, BAPEDALDA Provinsi Nanggroe Aceh Darussalam mengatakan, "ERD RKL dan RPL termasuk Praktik Pengelolaan Terbaik merupakan contoh pengelolaan lingkungan satu-satunya dan terbaik pada rehabilitasi dan rekonstruksi Provinsi Aceh pasca tsunami. Hal ini menunjukkan komitmen yang kuat dari USAID untuk mencegah kerusakan lingkungan lebih lanjut di Aceh yang telah porak poranda karena tsunami."

## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 4V - Human Interest Articles (Posted on Project Website)**

**Hope for the Hunted Sea Turtle**

**(Posted 28 May 2007)**

## Hope for the Hunted Sea Turtle

Released by USAID Road/Bridge Reconstruction and Rehabilitation Project, 28 May 2007

Seeing turtles while diving or snorkeling near the islands off the coast of Aceh is quite common. They are huge and impressive creatures that can be seen hunting in the coral or resting on the ocean floor. The regularity of these sightings makes it almost hard to believe that the sea turtles which nest on the west coast of Aceh are in danger of going extinct.

We'll never know how many turtles were killed by the tsunami that devastated the Indian Ocean region in December, 2004. However, the impact of the tsunami on turtles will be seen in the long-term. The waves dramatically changed the geography of the beaches where turtles nest. How that will impact the turtles' reproduction will not be known for many years. Perhaps the biggest threat to the turtles in Aceh however is the market for turtle eggs. Turtle eggs fetch between Rp2000 and Rp4000 in the market. Each time a turtle nests, it lays 80-150 eggs. The lure of this extra income is high in depressed fishing communities like those near Aceh's coastal nesting sights.

These villages lost most of their fishing boats in the tsunami. The village of Lhok Seudue alone lost all but two of its 90-boat fleet. Many of those boats have since been replaced through International Non-Governmental Organizations' (INGOs') livelihood recovery programs. However, many fishermen are still afraid of the sea and don't want to rely in it for their livelihood any longer. And those who do continue to fish have additional barriers from pre-tsunami times. The road to the larger markets, the west coast highway from Banda Aceh to Meulaboh, was heavily damaged in the tsunami. A trip to the market that used to take an hour now takes more than three. This means the fish are less fresh and therefore less valuable in the market when they do arrive. The cost of the trip has also tripled as the wear-and-tear to vehicles traveling the heavily pot-holed temporary roads is high. This means that profits from fishing are down.

The temptation of additional income from collecting turtle eggs a few hundred meters from your door and selling them is extremely high. Yet, as a female turtle only nest once in 2-4 years, the effect of the egg poaching can be devastating.

A new sea turtle preservation group called PAPA (Program Adopsi Penyu Aceh- Aceh Adopt a Turtle Program) is working with the communities near the sea turtle nesting sights to ensure the eggs get a fair chance at hatching. They run educational programs to increase awareness on the need for the conservation of turtles and turtle habitat. They also have a livelihood replacement program which involves buying the turtle eggs from those who want to collect them. They essentially pay the collectors to not dig up the eggs. The eggs remain in their nests and are guarded by the same local residents that were hunting for the eggs, until they hatch. The nests are also protected from predation by wild boars, lizards and dogs with wire fencing.

PAPA relies solely on individual and community donations for its funding, yet the grassroots program is proving quite effective. In 2006, they bought 570 eggs from collectors on the west coast of Aceh and saw approximately 400 hatched.

Once the baby turtles find their way to the sea, they have to face the perils of natural predators and fishing nets but.

They're off to a good start. And if programs like PAPA continue, their species may have a future after all.

## **2011 IRF InARoad Awards**

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### **Appendix 5**

**Daniel, Thomas, “Challenges of Emergency Relief Road Construction in  
Developing Countries” and poster that were presented at the 16th  
International Roads Federation world meeting, Lisbon, Portugal, May 2010**

## **CHALLENGES OF EMERGENCY RELIEF ROAD CONSTRUCTION IN DEVELOPING COUNTRIES**

Thomas Daniel  
Chief of Party  
Parsons Global Services, Inc.  
Jakarta/Aceh, Indonesia

### **Summary**

On December 26, 2004, the largest earthquake to strike since 1964 caused a devastating tsunami that has killed several hundred thousands of people in South and Southeast Asia. The 9.0 magnitude quake occurred off the Sumatra coast of Indonesia, triggering tsunamis that caused massive flooding, damage and loss of life in the coastal communities of the region. Hardest hit was the Indonesian province of Aceh, where an estimated 174,000 people were killed, and over 500,000 displaced. Critical basic infrastructure (water supply and sanitation, housing, roads and bridges, hospitals and schools), telecommunications, and power utilities were left in ruin. The national coastal road from Banda Aceh to Calang on the west coast was destroyed along most of its length, which blocked relief efforts and made ground surveys impractical - aerial images show whole bridge spans lifted and transported hundreds of meters away.

Given the cataclysmic events that devastated the Banda Aceh region and its ability to conduct even the most rudimentary economic activity, the United States Agency for International Development (USAID) stepped forward and has recognized that the key to restoring the economic and social fabric of Aceh Province required the construction of a new road through the tsunami damaged coastal area. On 07 July 2005 USAID signed a Strategic Objective Agreement (SOAG) with the Government of Indonesia's Reconstruction and Rehabilitation Agency for tsunami related post relief activities in Aceh which included the reconstruction and rehabilitation of the national highway which ran along the Aceh coast. The reconstruction effort has been an endless challenge of overcoming obstacles of logistics, government coordination, community outreach, capacity building/technology transfer and environmental management.

The paper will discuss some of the lessons learned and try to strike a balance between quick emergency disaster relief to reopen vital transportation links and long-term quality in reconstruction and rehabilitation projects.

**Keywords:** disaster, emergency relief, reconstruction, international, right-of-way

## 1. Background

Contrary to some public perception, road construction does not consist of merely slapping on a layer of asphalt pavement on Day One and driving on the new smooth surface on Day Two. Road construction is generally an odyssey of planning, decision making and responsive actions with construction starting from the bottom and working its way up, culminating in a paved surface. The general public is often unaware of the overall process, just the benefits that a new paved road brings.



*Remnants of the original Aceh Road in a tranquil setting 30 km south of Banda Aceh*

The Aceh Road project is no exception although its uniqueness following one of the greatest natural disasters in history made the odyssey particularly unpredictable. On December 26, 2004, a 9.1 magnitude earthquake, the largest on the planet in 40 years, struck some 150 kilometers off the western coast of Sumatra, Indonesia. The quake lasted for almost 10 minutes, triggering a series of tsunamis as high as 30 meters that killed an estimated 230,000 people and destroyed coastal communities in 11 countries between Southeast Asia and the east coast of Africa.

To establish a scope of relief and reconstruction efforts within the expected funding limit from the United States Government, the United States Agency for International Development (USAID) dispatched a team within two months of the tsunami to review the region. The team immediately identified that one of the most vital pieces of infrastructure destroyed by the tsunami was the national coastal road running south from Aceh's provincial capital of Banda Aceh, to west Aceh's major economic hub of Meulaboh, where one third of the city's 120,000 people lost their lives.



*Bridge abutments on the Aceh coast are a brash reminder of the awesome power of the tsunami.*

The 242 km road linking Meulaboh to Banda Aceh was the economic backbone of the region and included more than 110 bridges and crossings, all of which were damaged or destroyed. Such was the strength of the tsunami that whole sections of coastlines were moved and reshaped and complete lengths of bridge spans were lifted and dumped hundreds of meters away. Driving along the road today and seeing bridge abutments standing isolated in the middle of the ocean can only be described as surreal.

To move their vision forward USAID signed a Memorandum of Understanding with the Indonesian Ministry of Public Works to design, rehabilitate and reconstruct the coastal road. USAID then contracted with Parsons, an American A&E contractor, to provide the design of the new road and bridges and manage the maintenance and construction effort.



## 2. Set Realistic Expectations

Relief and reconstruction efforts following any natural disaster, be it a tsunami, earthquake or typhoon to name a few, will have unique challenges. Those challenges are

*The emergency road constructed by the Indonesian military immediately after the tsunami is a source of dust on the villages during the dry season and can be muddy and impassible during the rainy season.*

amplified when the disaster occurs in a developing country that must depend on international funding for reconstruction. A substantial portion of the reconstruction will in turn be provided by international agencies and contractors that are not established in the location of the disaster and do not have first-hand knowledge and experience with the local conditions.

The destruction of the tsunami was so indiscriminating and widespread that almost nothing in its path was spared. This included the local engineering community and the vast majority of the technical expertise in the region. Reconstruction efforts, therefore, did not have the benefit of local experience and expertise. Because of this, nearly all aid organizations had a secondary goal of rebuilding the Acehese community to be self-sufficient following the completion of the relief efforts and the departure of the international community.

The tsunami also destroyed all infrastructure in its path, making even a glass of clean,



*Temporary bridges that were built immediately after the tsunami and that are close to the ocean were subject to corrosion and prone to collapse under the weight of heavy construction vehicles.*

fresh water a prized commodity. Aerial photography, which would normally be a basis of a reconstruction plan, was unreliable because of the tsunami's devastation. Coastlines disappeared under the ocean while flatlands became swamps. Relief and reconstruction planning was consequently relegated to assumptions of how the coastline and terrain would evolve. With a scarcity of local expertise, limited reliable data and an urgency

to bring immediate relief to the suffering local community, organizations were driven into committing to almost spontaneous plans with the risk that the plans might be idealistic and impractical.

Such was the case with the Aceh Road project, which initially had a three year target for designing and constructing the new road. This quickly proved unrealistic as design standards were debated and the environmental document was prepared. Ultimately, the road and bridge design standards emerged as a combination of both



*Simple ferries run by the locals have been used at several locations while awaiting the completed road.*

American Association of State Highway and Transportation Officials (AASHTO) and Association of Southeast Asian Nations (ASEAN) standards.

To temporarily restore ground transportation along Aceh west coast prior to the construction of the new road, the Indonesian military constructed an emergency route shortly after the tsunami. Traveling on the temporary route was rugged as vehicles had to navigate unpaved gravel roads, one-lane temporary bridges, and improvised ferries comprised of wooden planks fastened to two or three rowboats that were powered by an outboard motor.

Designing the new two-lane road had to take into account Aceh's unique blend of rainforest, coastal swamplands and steep limestone hills. The alignment's design also had to comprise segments of new road to replace roads that had disappeared where the coastline was reshaped, and link these with segments of pre-existing road that needed to be rehabilitated and often widened.



*Providing a more direct and safer alignment required blasting through limestone hills.*

At the critical early stage, USAID made an important decision to focus on the quality, safety and durability of the new road at the expense of quick completion. USAID could have elected to simply reconstruct the pre-tsunami road, which in large part would have involved overlaying and following the alignment of the 6m wide, two lane road. Instead, USAID elected to provide an 11m wide road that included 2m shoulders. Wherever feasible, meandering existing alignments were straightened to provide a more direct and safer route.

The road was also constructed inland from the coast and on higher ground to improve its durability. This has resulted in cuts of up to 65m in height and, similarly, fills of up to 35m to balance the earthwork as much as possible. The scope of the reconstruction was ultimately consolidated into 146 km of new and rehabilitated road as well as 27 steel truss and concrete bridges and 254 drainage culverts.



*The Aceh Road runs over a tropical terrain of swampland, rainforest, and mountains.*

USAID was sensitive to the plight of the region and the immediate need for a paved road. Hence, a priority contract was awarded to an Indonesian contractor to construct mainly new road in the highly traveled northern area approaching Banda Aceh. USAID could also have included incentives and disincentives into the priority contract to accelerate construction. But the premium to accelerate construction would have depleted the fixed budget, which ultimately could have reduced the overall scope of the road reconstruction.

### **3. Consider Local Constraints and Sensitivities**

The decision to provide a new alignment to international standards for a national road carried risk. Getting legal access to the land needed for the right of way often involved lengthy negotiations and compensation issues and, ultimately, the procurement of approximately 3,800 properties. This is a large figure in any country and, in this instance, is a tragically large figure, because the majority of the landowners at the time of the tsunami were killed while official records regarding land titles and property ownership were washed away.



*In accordance with local standards, rudimentary construction methods were frequently employed, such as the use of coconut palm scaffolding to support the erection of steel bridges.*

During the chaotic early days of the design phase, input was solicited from the Provincial Government and, in some cases, from the local communities with the intent of finding the optimal route for the new road. It quickly became apparent that these requests tended to stifle rather than facilitate the decision process as it was impossible to develop an alignment that pleased all parties without compromising the design standards. Houses, graveyards and public facilities such as mosques and schools were just some of the obstacles that were located within

potential road corridors. A shift of the road alignment by just 30m to avoid a single obstacle could cause the new road corridor to impact many other obstacles that were not touched by the originally proposed alignment.

There was also a common misunderstanding that USAID's grant was limitless. On the contrary, any increases in cost as a result of alignment shifts could have led to reductions in the overall scope to keep the cost of the project within the fixed budget. Idealistic options such as tunnels and viaducts to avoid winding mountainous roads that were proposed by local authorities were quickly dismissed as too costly.



*An outreach program was geared toward resolving community issues to facilitate construction and gain acceptance of the new road.*

Unfortunately, the endless debates and costly revisions in a futile effort to please all stakeholders were causing the project schedule to slide with the ultimate losers being the people of Aceh. To keep the project on track, USAID made a second major decision to freeze the alignment that was impartially established by Parsons, with USAID concurrence, in accordance with the project requirements and constraints. This brought an abrupt end to the route selection phase and allowed the project to move aggressively ahead.

Once the alignment was established and the right of way acquisition commenced, the benefits of the new road were promoted to the local communities. Special consideration was given for local sensitivities, for instance concerns about relocating gravesites, or how the road would affect local customs and beliefs, such as happened in one area where the local legend says the community's graves were guarded by a mystical white tiger. Despite these inevitable conflicts between the road and traditional sites, most were quickly and peacefully resolved as the overwhelming majority of the Aceh people were anxious for their new road.

The potential for violent conflicts in the field was one of the major concerns at the onset of the project as the Aceh region had been afflicted by 30 years of insurgency and civil conflict prior to the tsunami. This concern proved to be valid as security threats were one of the contributing reasons that led to a suspension of work in the central section of the alignment.

There have been also isolated security incidents that have caused temporary stoppages and numerous obstructions erected by local landowners as a means of accelerating compensation for their land or as leverage for an additional drainage culvert in locations where a landowner feared the new road would block the natural flow of water. Opportunistic individuals have also attempted to obstruct construction as a tactic to extort additional unjust payment.

The Indonesian Government had the option to enact the principle of eminent domain if negotiations with landowners failed as a means of accelerating the acquisition of right of way for the public welfare. Indeed, there are few instances where eminent

domain would appear more justified than following the tsunami since there are no alternative routes along the coastline other than the Aceh Road. Nevertheless, this option would have inevitably lead to community revolts and an overall longer duration to obtain the required right of way than allowing parcels to be obtained through negotiations one by one.



*Numerous rock cuts and mountainous routes offer spectacular views of Aceh's pristine coastline.*

The uncertainty with the acquisition of right of way, even following a catastrophe like the tsunami, and the security in the region were two of the greatest risks considered when establishing a realistic schedule for the Aceh Road construction.

Finally, the lack of regional equipment and skilled labor following the tsunami combined with a surge in demand for these resources by the relief organizations impacted the contractors' abilities to adequately and economically provide the resources to expeditiously complete the Aceh Road.

#### **4. Conclusion**

Any road project, from disaster relief in a developing country to a sophisticated, multilevel freeway in a wealthy, industrialized nation, requires solid planning to establish reasonable goals within the project constraints. Often trade-offs are required between conflicting constraints, for example schedule vs. cost. In these instances, the optimal balance must be found.

Disaster relief projects carry an understandable urgency to bring badly needed aid to suffering people. However, reasonable expectations must be established with consideration of the local conditions and the available budget so that the relief efforts can remain focused on their target of improving the well being of the people in the impacted area. This can be particularly challenging in developing countries where a strong understanding of local constraints and conditions is essential to establishing a realistic plan.

Strong leadership is also important to prevent delays due to indecision. This is not to imply that the governmental agencies and local communities should be excluded from the decision process. A consensus of all stakeholders is invaluable toward public acceptance. However, nothing will erode public perception of the success of a project faster than delays.

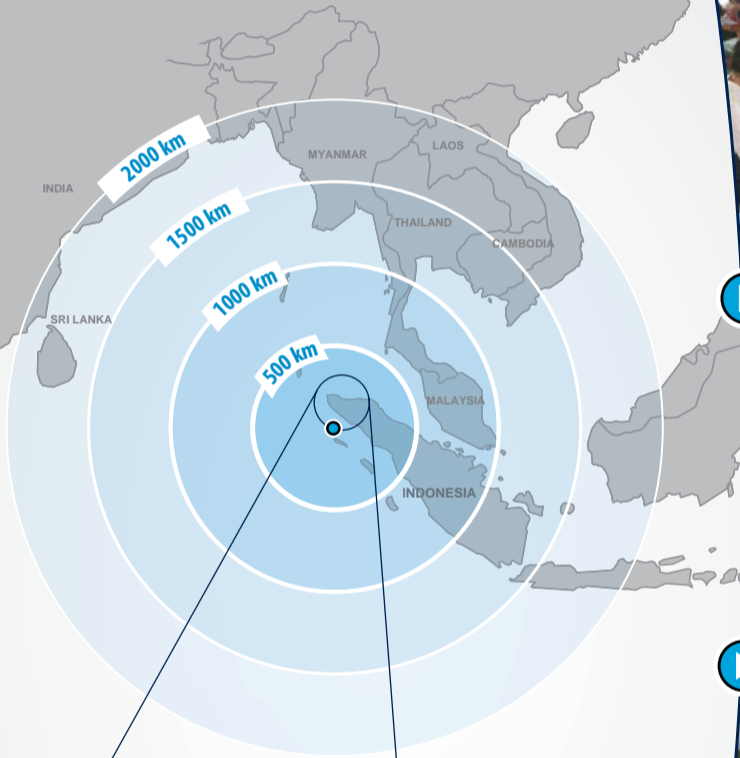
In addition to the smooth, safe and durable new road USAID and Parsons are also committed to transferring to the Acehnese engineering community knowledge and experience with international standards in roadway design, construction methods, safety and environmental management. Long after the project is complete the legacy of the project will not just be new road but a higher standard that will improve the quality of future Aceh roads.

ACEH, INDONESIA

Striking a balance between quick emergency disaster relief and long-term quality to reopen vital transportation links.

On December 26, 2004, a 9.2 magnitude earthquake—the largest on the planet in 40 years—struck some 150 kilometers off the western coast of Sumatra, Indonesia. The quake triggered a series of tsunamis as high as 30 meters that killed an estimated 230,000 people and destroyed coastal communities in 11 countries between Southeast Asia and the east coast of Africa – including the national highway on Aceh's northwest coast.

Given the cataclysmic scale of the destruction and the region's inability to conduct even the most rudimentary economic activity, the United States Agency for International Development (USAID) recognized that reconstructing the national highway was key to restoring the Aceh economy and the lives of its residents. To achieve this goal, USAID contracted with Parsons to prepare the design and manage the construction.



**● EPICENTRE**  
DATE December 26, 2004  
TIME 07:58 (UTC+7)  
MAGNITUDE 9.2  
— Aceh Road/Bridge Reconstruction and Rehabilitation Project

## ▶ DEVASTATION OF TSUNAMI



Coastlines were reshaped and bridge spans were driven hundreds of meters away. The destruction was so indiscriminating and widespread that almost nothing in its path was spared, including infrastructure as well as the local engineering community and the vast majority of the technical expertise in the region.



## ● ADHERE TO FINANCIAL CONSTRAINTS

## ▶ DIFFICULT LOGISTICS AFTER TSUNAMI



Commitments to spontaneous plans carried the risk of being idealistic and impractical. A three-year target for design and construction proved unrealistic as design and environmental standards were debated. Therefore, USAID focused on quality, safety, and durability at the expense of quick completion. To keep the project on track, USAID ensured the Aceh Government committed to the established alignment to prevent costly re-designs and meet the fixed budget.

## ● STRONG LEADERSHIP

## ▶ COMMUNITY CONSULTATIONS



Strong leadership is important to prevent delays resulting from indecision. Although a consensus of governmental agencies and local communities is invaluable toward public acceptance, nothing will erode public perception more than delays. An outreach program that included more than 75 individual village meetings was geared toward resolving community issues to facilitate construction and gain acceptance of the new road.

## ● SET REASONABLE EXPECTATIONS

## ▶ ACQUISITION OF RIGHT-OF-WAY

Gaining legal access to the land needed for the right-of-way involved lengthy negotiations and compensation issues and, ultimately, the procurement of approximately 3,800 properties. This is a tragically large figure, because most landowners at the time of the tsunami were killed while official records regarding land titles and property ownership were washed away.



## ● CONSIDER LOCAL CONSTRAINTS

## ▶ CONTROLLING SECURITY RISKS



Violence was one of the major concerns at the onset, as the Aceh region had been afflicted by 30 years of insurgency and civil conflict prior to the tsunami. This concern proved to be valid as security incidents caused temporary stoppages.

Placing responsibility on the Aceh Government proved to be an effective tactic at limiting violence and extortion attempts aimed at inflating the project cost for personal benefit.

## ● QUALITY AND SAFETY

## ▶ BLEND INTERNATIONAL AND LOCAL STANDARDS

The new road runs through Aceh's unique blend of rainforest, coastal swamplands, and steep limestone hills. Meandering existing alignments were straightened to provide a more direct and safe route. In accordance with local standards, rudimentary construction methods were frequently employed, yet quality was not compromised.



## ● TECHNOLOGY TRANSFER

## ▶ REBUILDING THE LOCAL ECONOMY



In addition to the smooth, safe, and durable new road, knowledge and experience with international standards in roadway design, construction methods, safety, and environmental management were transferred to the Acehnese engineering community. Long after the project is complete, the legacy will not only be a new road but a higher standard that will improve the quality of future Aceh infrastructure.



## **2011 IRF InARoad Awards**

**Project: Aceh Road Rehabilitation and Reconstruction Project**

**Award Category: Rural Transport**

**Submitting Organization: United States Agency for International  
Development (USAID)**

**Contact Information: Roy Ventura (+62-81-1900525, rventura@usaid.gov)**

### **Appendix 6**

**Magliola, Robert “Up-tempo number - Standard designs and limited types  
speed bridge and road reconstruction in remote Indonesia” Road & Bridges,  
September 2009**

ALSO: BIOMASS ASPHALT • WINTER MAINTENANCE

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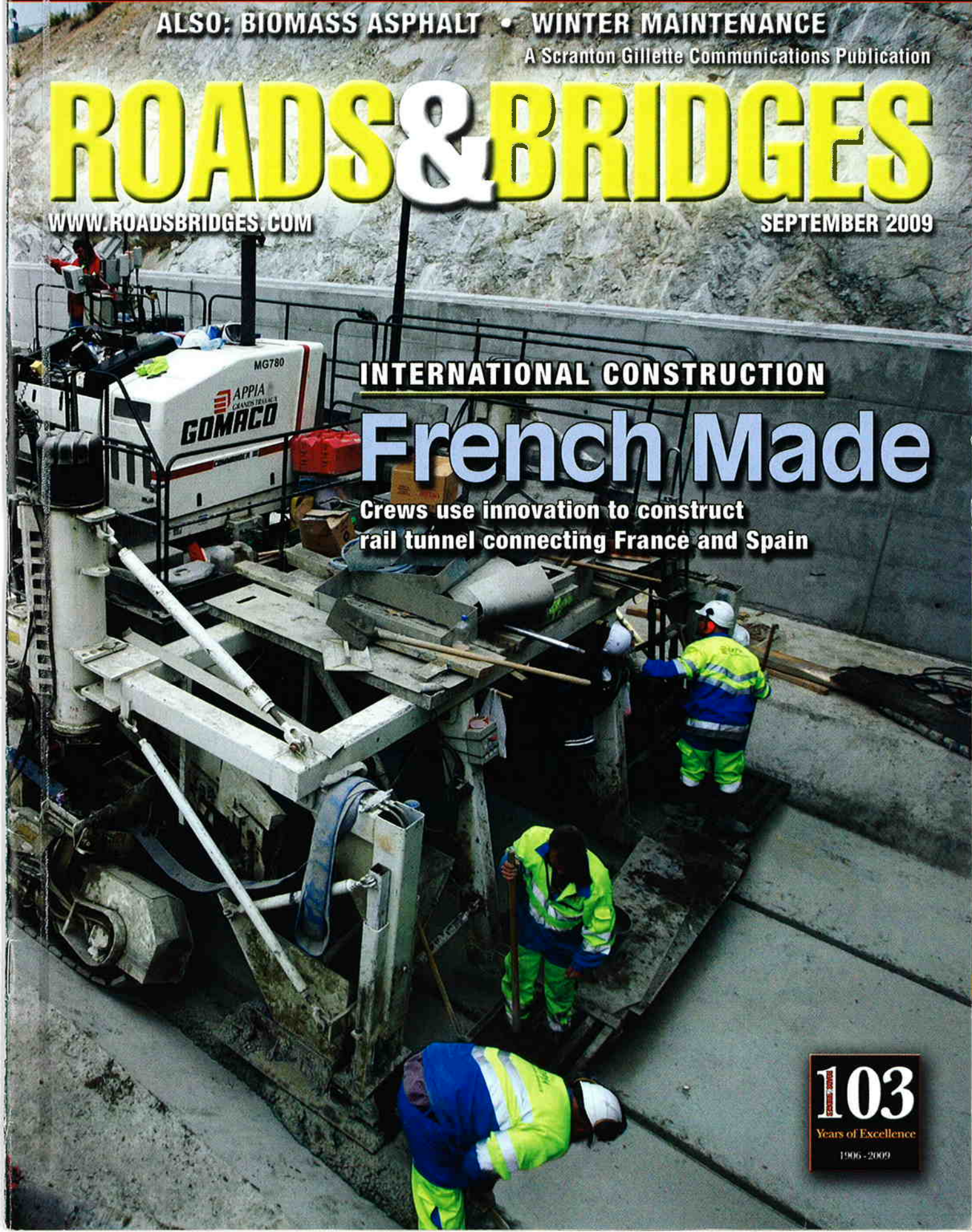
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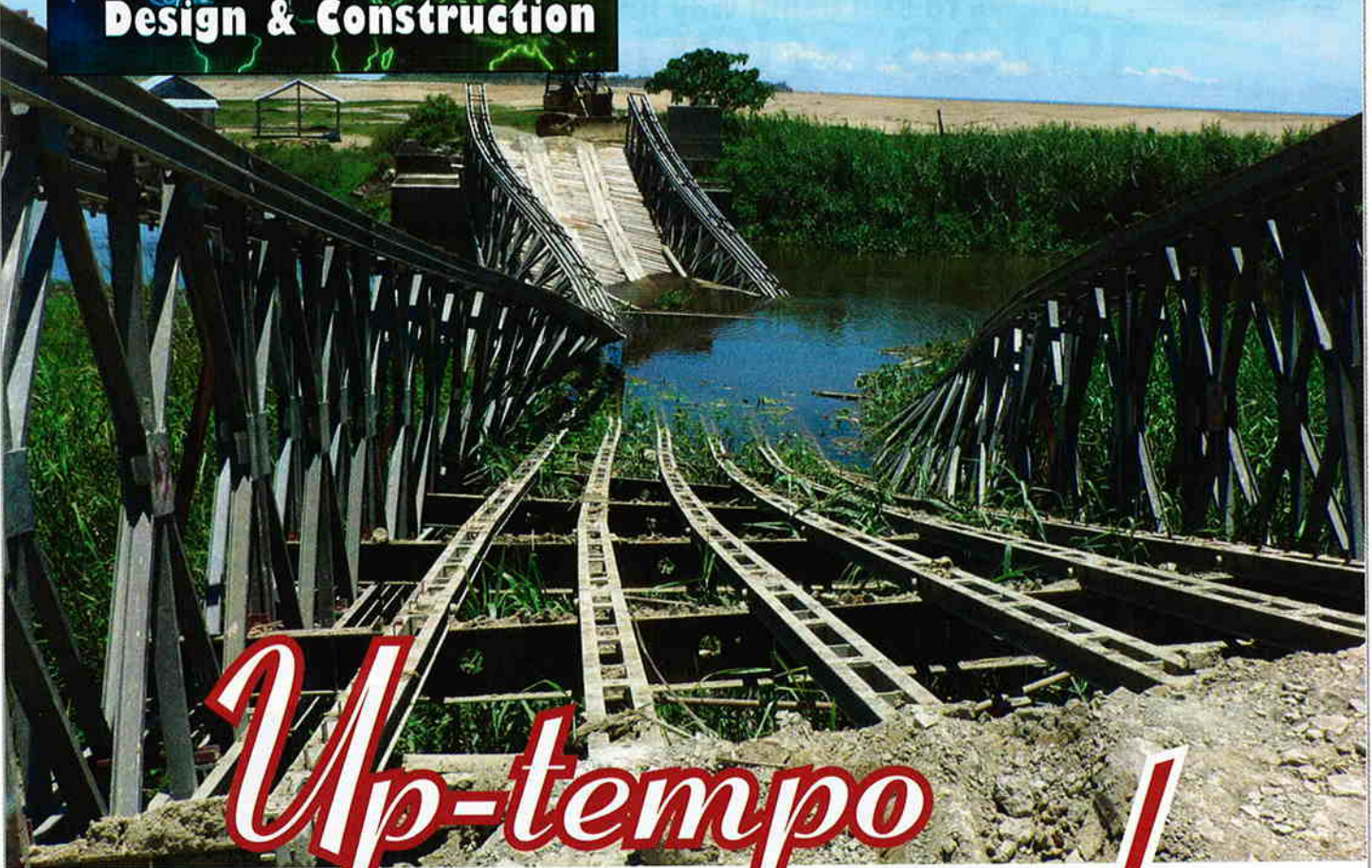
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# Up-tempo number

Standard designs and limited types speed bridge and road reconstruction in remote Indonesia

**T**he Sumatra-Andaman earthquake and resulting tsunami of 2004 claimed more than 230,000 lives and left 1 million homeless.

Especially hard hit was the northwest coast of the Aceh Province on the island of Sumatra in Indonesia, where the human toll was 167,700 (130,700 fatalities; 37,000 missing and assumed dead).

Along the Aceh coast, from the cities of Banda Aceh in the north to Meulaboh 190 km south, 12 towns were washed away as well as long

segments of the north-south coastal highway including 90 bridges. Travel on the route, normally a four-hour drive from Banda Aceh to Meulaboh, became a 20-plus-hour ordeal by four-wheel-drive vehicle. Depending on rain, the highway was impassable at times. The loss of the highway crippled the region's transportation system, hampered post-tsunami re-

construction and created great social and economic hardships.

The U.S. through USAID committed \$900 million in tsunami relief aid, with \$245 million going toward the reconstruction of the Banda Aceh-to-Meulaboh Road. This article discusses the tsunami's impact and the emergency response and covers how structure type selection was made based on local construction practice, site accessibility and material availability. It tells of the construction means and methods and of the programmatic design process instituted by Parsons, Chicago, the lead engineering firm on the job.

A year after the tsunami, the Parsons engineering team drove the 240-km route between Meulaboh and

Banda Aceh and observed first-hand the emergency bridge constructions.

At some waterways, temporary panel bridges had been constructed. These bridges were holding up well for the most part, except for the timber decks, which were becoming worn and had occasional missing planks. Other bridges seemed to be of local design and construction from materials that could be obtained locally. Many bridges were made of tree trunks and logs. The nicer variety of these had timber plank decks.

### Non-American ingenuity

At the Lambeso River an individual started his own ferry service. Originally he collected tolls, but eventually he was paid a monthly stipend to provide free service to travelers. Cars boarded the ferry by timber planks spanning to the dock. Boarding was

a risky operation that shut down the ferry at times when cars drove off the planks and became wedged between the ferry and the dock.

Parsons' contract with USAID allowed nine months for design and to prepare construction documents for 165 km of roadway and 90 structures. Following the design phase Parsons' contract continued in the form of providing construction management services. To meet the schedule, structural design needed to begin immediately without geotechnical data, roadway geometry, structure locations or required structure lengths. The first step was to understand the local conditions and practices. This came first-hand in meetings with the Indonesian Ministry of Public Works (MPW), Indonesian fabricators and contractors and site visits to the structure locations.

The next step was to mobilize a large design staff. For the structural design effort, Parsons staff in four U.S. design offices, from Washington, D.C., to Seattle, Wash., worked together on the project and had to coordinate with the Parsons staff in Jakarta and Banda Aceh, Indonesia.

To facilitate coordination, project-specific design criteria (PSDC) were written. Such a document is common practice at Parsons for projects with large staffs and is invaluable when work is spread over several offices. The PSDC specified which sections of the AASHTO 17th Ed. bridge code were to be replaced by the Indonesian bridge design code (Bina Marga). It detailed bridge cross sections specifying lane, shoulder and sidewalk widths. Typical details for traffic barrier and pedestrian railing were given. Design loads were given

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as well as provisional loads such as future utility and resurfacing loads. It also specified material strengths for concrete, steel, reinforcing bars, prestressing strand and bolts.

The PSDC proved to be very important in the design coordination with USAID and the U.S. Army Corps of Engineers (USACE), who were retained by USAID to review Parsons' work. The Indonesian MPW also provided comment on the designs. Prior to beginning design work, all of these stakeholders agreed to the PSDC.

With little schedule it was evident that stand-alone construction plan sets could not be prepared for each structure. Early on it was agreed that Parsons would proceed with the preparation of standard plans for three types of structures: cast-in-place box culverts, prestressed concrete I-girder bridges and steel-truss bridges. These structure types satis-

**Overloaded trucks were the cause for the failure of one of the panel bridges and one of the log bridges. However, the log bridge was built by local tradesmen, and the construction was not based on an engineered design.**

## Truckload of difference

An important difference between the Bina Marga bridge design specification and the AASHTO bridge design specification was the greater design live load specified by Bina Marga. The reason for the difference was greater truckloads in Indonesia, and from what was observed as a common occurrence of overloaded trucks. Overloaded trucks were the cause for the failure of one of the panel bridges and one of the log bridges. However, it must be admitted that the log bridge was built by local tradesmen, and the construction was not based on an engineered design.

It was ascertained in reviewing the Bina Marga code that it closely corresponded to the AASHTO 17th Ed. LFD code, but the live-load magnitude differed notably. Similar to AASHTO the Bina Marga live load

Marga live-load, temperature-range and seismic-response spectrum. All other design criteria were based upon AASHTO 17th Ed., which was the preference of USAID.

A key constraint driving the structure-type selection was site accessibility. Construction equipment and material delivery would have to be made over dirt roads and temporary bridges that proved unreliable at times.

Another constraint was material availability. Precast concrete I-girders and piles were available from fabricators in Medan, Indonesia, located 300 km away by road. Steel girders would have to come from Jakarta, a 1,500-km trip by sea and land.

Another constraint was accepted design and construction practices. For example, jointless integral abutment bridges, proposed by Parsons, were rejected by the Indonesian MPW because they were not familiar



fied the constraints of site accessibility, material availability and common construction practices.

With the standard plans providing the design, the only unique plan sheet for each bridge was the structure layout sheet, which presented the structure plan and elevation and gave key dimensions.

To aid in bidding, pay-item quantities for each structure were given in quantity tables categorized by structure type. As part of the construction work, the contractor was required to provide complete shop drawings specific to each structure. This confirmed that the standards were being applied correctly and that site-specific variations were being correctly incorporated into the structure's construction.

has lane-load and truckload cases. Impact factors are variable and are based upon length of loaded span. AASHTO's truckload is a three-axle vehicle with axle loads of 35.6 kN, 142.3 kN and 142.3 kN. The Bina Marga truckload also has three axles but with magnitudes of 50 kN, 200 kN and 200 kN—40% greater than AASHTO. The Bina Marga lane load has uniform-load and rider-load components as does AASHTO, but the magnitudes are much greater. The Bina Marga uses a uniform load of 8 kN/sq meter and a rider load of 44 kN/meter, compared with AASHTO's uniform load of 3.1 kN/sq meter and rider load of 37.9 kN/meter. The culmination of the review of the Bina Marga code was to adopt the Bina

with that construction method. Steel-bridge barrier railing, recommended by Parsons, was rejected in favor of cast-in-place concrete barrier over concerns that it would be stolen for steel scrap.

Sixty of the 90 structures were replaced by reinforced concrete-box culverts. Culverts were cast in place to eliminate the challenges associated with shipping precast boxes. Concrete was mixed at batch plants set up by the contractor at various locations along the project corridor.

The standard structural plans for single-cell and multi-cell box culverts provided tabulated designs for cells as large as 3 x 3 meters and cover depths ranging from 0 to 10 meters. The standard plans detailed the

culvert headwalls, wingwalls and a unit length of the culvert barrel. Culvert locations were identified on the roadway plan sheets and quantities tabulated in a culvert schedule.

cast deck panels with a 130-mm reinforced concrete topping.

During construction the contractor requested that precast deck panels be no larger than 1,510 mm by

## Measure for geology

For most of its length, the highway hugs the west coast at an elevation just above sea level between the beach and the steep volcanic hills.



**Left: The Indonesian MPW requested that the maximum prestressed concrete I-girder beam lengths be limited to 33 meters.**

**Right: Along the Aceh coast 12 towns were washed away as well as long segments of the north-south coastal highway.**

**Far Right: Steel-truss spans ranged from 40 to 80 meters in length.**

Culverts beyond the applicability of the standard plan tables were designed on a case-by-case basis.

The Indonesian MPW requested that the maximum prestressed concrete I-girder beam lengths be limited to 33 meters. Standard single-span bridge designs were prepared for girder lengths of 19, 22, 25, 28 and 33 meters. Thirty-nine-meter and 45-meter-long bridges were designed consisting of two equal simple spans each.

In response to shipping constraints and to facilitate erection, precast concrete I-beams were fabricated in approximately 6-meter-long segments.

## Assembly required

At the bridge site, segments were assembled and post-tensioned into a continuous beam. Epoxy was applied to the keyed mating surfaces prior to post-tensioning. The preferred erection method was to launch the individual girder segments across temporary supports. They were post-tensioned after the segments were in position from one bridge pier to another.

Another erection method was to stage the girder assembly and doing post-tensioning on the embankment behind the abutment before launching the girder as one piece instead of as individual segments. Once girders were in place, a two-course deck was constructed. The deck consisted of 70-mm-thick pre-

500 mm to keep the piece weight below 1,250 kN. This request was to facilitate their placement in the field by hand.

For bridges longer than 45 meters, steel-truss bridges were the contractor's bridge type of choice, especially if this eliminated pier work in the river. Steel-truss spans ranged from 40 to 80 meters in length. Beyond 80 meters, truss bridges comprised multiple spans.

The longest truss bridges consisted of two spans of 60-meter trusses. All steel-truss bridges, except the 80-meter single-span truss bridge, had a common panel length of five meters. The standard panel length permitted a typical floor system to be used for all truss bridges.

The floor system consisted of 6-mm-thick corrugated steel decking, which has adequate strength to support the full live load. This was desired by the contractor since the steel decking supported crane loads during truss erection. Upon the decking a reinforced concrete deck was cast.

The contractor elected to perform deck casting under a shade shelter to control shrinkage cracking. Trusses were fabricated in Jakarta and fully assembled in the factory to check fit-up prior to shipping. Truss-bridge erection was performed on temporary shoring constructed of palm tree trunks. All steel members and hardware were hot-dip galvanized for corrosion protection.

Site-specific geotechnical data was not available during design for most of the structures. But the general geology was known. At most bridge locations the geology consists of underlying rock with 10 to 15 meters of soft-soil overburden. At locations where there is no beach, the road rises into the rocky hills, and structures are founded directly on rock.

Standard plans were developed for two foundation cases: piles driven to rock and spread footings on rock. For each of the bridges an estimate of the rock elevation was made and judgment was used to select the foundation type for the purposes of bidding.

Construction contract documents required the contractor to obtain borings at each bridge location to verify the applicability of the foundation assumptions made during design. Pile driving was governed by a variation of the Hiley formula.

Based upon input from contractors and material availability, two pile types were used in construction: 400-mm square precast, prestressed concrete piles for lightly loaded foundations and 600-mm-diam. spun, precast, prestressed hollow piles for heavily loaded foundations.

Piles were fabricated in Medan and trucked to the bridge sites in 15-meter lengths. Pile splicing was accomplished by casting steel plates into the pile segment ends and welding the plates together in the field.

WiKA, an Indonesian contractor, was awarded a one-year road maintenance contract in September 2005 to maintain an 80-km segment of the emergency road. As construc-

tion near Banda Aceh while the remaining contracts were being tendered, USAID expanded the scope of WiKA's contract to include 40.2 km of roadway and 14 bridges in March

and October of 2006. The work on these contracts was to be completed within 15 months. However, due to slow progress caused in part by community obstructions and the unavailability of the full right-of-way, USAID elected to decommission the partially completed southernmost section of WiKA's contract to enable it to focus on the remaining 28.3 km of roadway and 10 bridges. Issues with the community that had obstructed progress have since been resolved and the remaining work is expected to continue later this year with a different contractor.

The balance of the construction work, which consists of approximately 105 km of new and rehabilitated road and 13 bridges, was awarded to SSangyong-Hutama Karaya, a South Korean-Indonesian joint venture, in June 2007. Their work is to be completed by March 2010. **R&B**



tion contracts were let for sections of roadway, the selected contractors took over the road maintenance of the corresponding sections of the entire emergency road between Banda Aceh and Calang.

In order to expedite construction of the highly traveled northern sec-

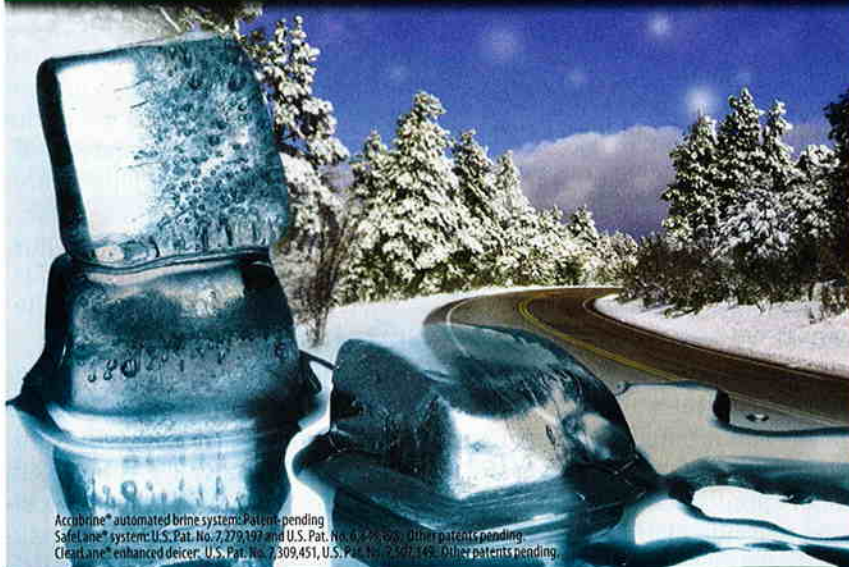
tion contracts were let for sections of roadway, the selected contractors took over the road maintenance of the corresponding sections of the entire emergency road between Banda Aceh and Calang. In order to expedite construction of the highly traveled northern sec-

Magliola is with Parsons, Chicago.



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