

GAO

Report to the Subcommittee on Asia
and the Pacific, Committee on Foreign
Affairs, House of Representatives

July 2012

FOREIGN ASSISTANCE

Actions Needed to Help Ensure Quality and Sustainability of USAID Road in Indonesia



G A O

Accountability * Integrity * Reliability

Highlights of [GAO-12-728](#), a report to the Subcommittee on Asia and the Pacific, Committee on Foreign Affairs, House of Representatives

Why GAO Did This Study

In December 2004, an earthquake in the Indian Ocean caused a major tsunami that devastated several countries, affecting Indonesia most severely. In May 2005, Congress appropriated \$908 million for aid to the affected countries. USAID budgeted \$245 million of this amount to rehabilitate and construct a 150-mile paved coastal road in Aceh Province, Indonesia, with a planned completion date of September 2009. After reducing the project's scope, USAID completed a 91-mile road in April 2012 at an estimated cost of \$256 million. GAO was asked to (1) describe USAID's construction operations as well as factors that delayed the road's completion, (2) assess USAID's efforts to ensure the road's quality, and (3) examine factors that could affect the road's sustainability. GAO reviewed USAID documents, interviewed USAID and Indonesian officials, and traveled the entire length of the road.

What GAO Recommends

GAO recommends that USAID (1) ensure that road sections still under a 1-year warranty are inspected in a timely manner and require the construction contractor to make any needed repairs and (2) work with the Indonesian government to develop and implement a process addressing factors that could affect the road's sustainability. USAID stated that it concurred with GAO's first recommendation and concurred with the intent of GAO's second recommendation.

View a video of GAO's March 2012 inspection of the road.
http://www.gao.gov/multimedia/video#video_id=592299

View [GAO-12-728](#). For more information, contact David Gootnick at (202) 512-3149 or gootnickd@gao.gov.

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What GAO Found

From August 2005 to September 2010, the U.S. Agency for International Development (USAID) awarded five contracts to reconstruct a major coastal road in Aceh Province, Indonesia. Three of the contracts were for construction, one contract was for design and supervision, and one contract was for project management. Several factors delayed the road's completion and increased costs. For example, according to USAID, when one contractor did not make acceptable progress, the agency reduced the scope of work, terminated construction of an 8-mile road section, and hired another contractor to complete the section. Other factors included the Indonesian government's difficulty in acquiring land for the road and local opposition to the new road alignment.

USAID took several actions to ensure quality in the road's design and construction. For example, USAID hired an experienced, U.S.-registered professional engineer as Project Manager and hired a U.S.-based engineering firm to design the road and supervise most construction. USAID also required contractors to remain liable for any quality defects for 1 year after completing road sections. In addition, USAID required the Project Manager and the engineering firm to perform routine inspections, including final inspections when the warranties ended. Some inspections revealed poor-quality work that the contractors corrected. However, the engineering firm's and Project Manager's contracts ended in March 2012 and April 2012, respectively, leaving no qualified staff to inspect around 50 miles—more than half of the completed road—still under warranty. USAID told GAO it is considering rehiring the Project Manager on an intermittent basis, but USAID has not finalized this arrangement and has no mechanism to ensure quality in these sections.

USAID also took several actions to help ensure the road's sustainability, such as designing it to withstand heavy weights and providing a maintenance plan and equipment to the Indonesian Directorate General of Highways. However, various factors could affect the road's sustainability for its intended 10-year design life. For example, according to USAID and Indonesian officials, the Directorate lacks resources needed to maintain the road. Also, according to USAID, the Indonesian government has not taken certain actions, such as using portable scales to prevent overweight vehicles that could cause pavement failure and prohibiting construction in the road right-of-way that could obstruct drainage.

Sections of Old Road Destroyed by Tsunami and New Road Built by USAID



Source: GAO.
Section of old road destroyed by tsunami



Section of new road built by USAID

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Abbreviations

the Directorate	Indonesian Directorate General of Highways
Parsons	Parsons Global Services, Inc.
SsangYong	SsangYong Engineering & Construction
SsangYong-Hutama	SsangYong-Hutama Karya Joint Association
State	U.S. Department of State
USAID	U.S. Agency for International Development
WIKA	PT Wijaya Karya

View GAO-12-728 Key Components

Foreign Assistance: Actions Needed to Help Ensure Quality and Sustainability of USAID Road in Indonesia

http://www.gao.gov/multimedia/video#video_id=592299, a multimedia video to GAO-12-728.

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G A O

Accountability * Integrity * Reliability

United States Government Accountability Office
Washington, DC 20548

July 19, 2012

The Honorable Donald A. Manzullo
Chairman
The Honorable Eni F.H. Faleomavaega
Ranking Member
Subcommittee on Asia and the Pacific
Committee on Foreign Affairs
House of Representatives

The tsunami of December 2004, caused by an earthquake in the Indian Ocean near Indonesia, widely devastated 12 Asian and East African countries. In May 2005, Congress appropriated approximately \$908 million in assistance for tsunami relief, reconstruction, and related programs.¹ Using about \$350 million of these funds, the U.S. Agency for International Development (USAID) began its overall tsunami reconstruction program in Indonesia—which sustained the greatest estimated damage—later in fiscal year 2005 with activities such as constructing shelters and small-scale infrastructure. USAID also announced plans to further assist Indonesia by constructing a 150-mile coastal road in Aceh Province, on the island of Sumatra, with a planned completion date of September 2009 and an estimated cost of \$245 million. After encountering numerous obstacles, in fiscal year 2006 USAID reduced the planned road length to 91 miles, extended the estimated completion date to February 2010, and increased the estimated

¹Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Tsunami Relief, 2005, Pub. L. No. 109-13, Div. A, Title IV (May 11, 2005).

cost to \$254 million.² USAID completed the 91-mile road in April 2012 at an estimated cost of \$256 million.³

In response to your request, this report (1) describes USAID's construction operations as well as factors that delayed the road's completion, (2) assesses USAID's efforts to ensure the road's quality, and (3) examines factors that could affect the road's sustainability.

To address these objectives, we reviewed USAID and contractor documents and reports. We also interviewed USAID officials in Washington, D.C., and Indonesia as well as Indonesian government officials and contractors, including engineers and project managers, in Indonesia. In addition, we traveled the length of the 91-mile road with USAID officials in March 2012, when the construction was nearly completed.⁴ During our travel, we observed several ongoing activities, such as contractors removing a section of faulty pavement and building a retaining wall, as well as completed road sections, bridges, and other features. We based our assessment of the road's quality on the use of established design and construction standards and practices by USAID and its contractors. For this report, we defined sustainability, based on the Organization for Economic Cooperation and Development's definition, as the ability of the Indonesian government to operate and maintain the USAID-constructed road in such a condition as is required to produce the

²We previously reviewed USAID's overall tsunami reconstruction activities, focusing on large infrastructure projects in Indonesia and Sri Lanka. We issued reports in 2006 and 2007, before the bulk of road construction work had begun, that included recommendations to address reporting issues, identify potential risks that could affect costs and schedule, and identify ways to mitigate risks. The Department of State (State), with information provided by USAID, addressed our recommendations. See GAO, *Foreign Assistance: USAID Has Begun Tsunami Reconstruction in Indonesia and Sri Lanka, but Key Projects May Exceed Cost and Schedule Estimates*, [GAO-06-488](#) (Washington, D.C.: Apr. 14, 2006) and *Foreign Assistance: USAID Signature Tsunami Reconstruction Efforts in Indonesia and Sri Lanka Exceed Initial Cost and Schedule Estimates, and Face Further Risks*, [GAO-07-357](#) (Washington, D.C.: Feb. 28, 2007).

³As of July 2012, USAID reported that it could not yet determine the final cost of the road because, among other things, a pending claim of \$2.3 million and a potential payment of value added tax of \$4.4 million were still outstanding.

⁴View a video of our March 2012 inspection of the road.
http://www.gao.gov/multimedia/video#video_id=592299

projected benefits for the road's intended 10-year life expectancy.⁵ See appendix I for a more detailed description of our scope and methodology.

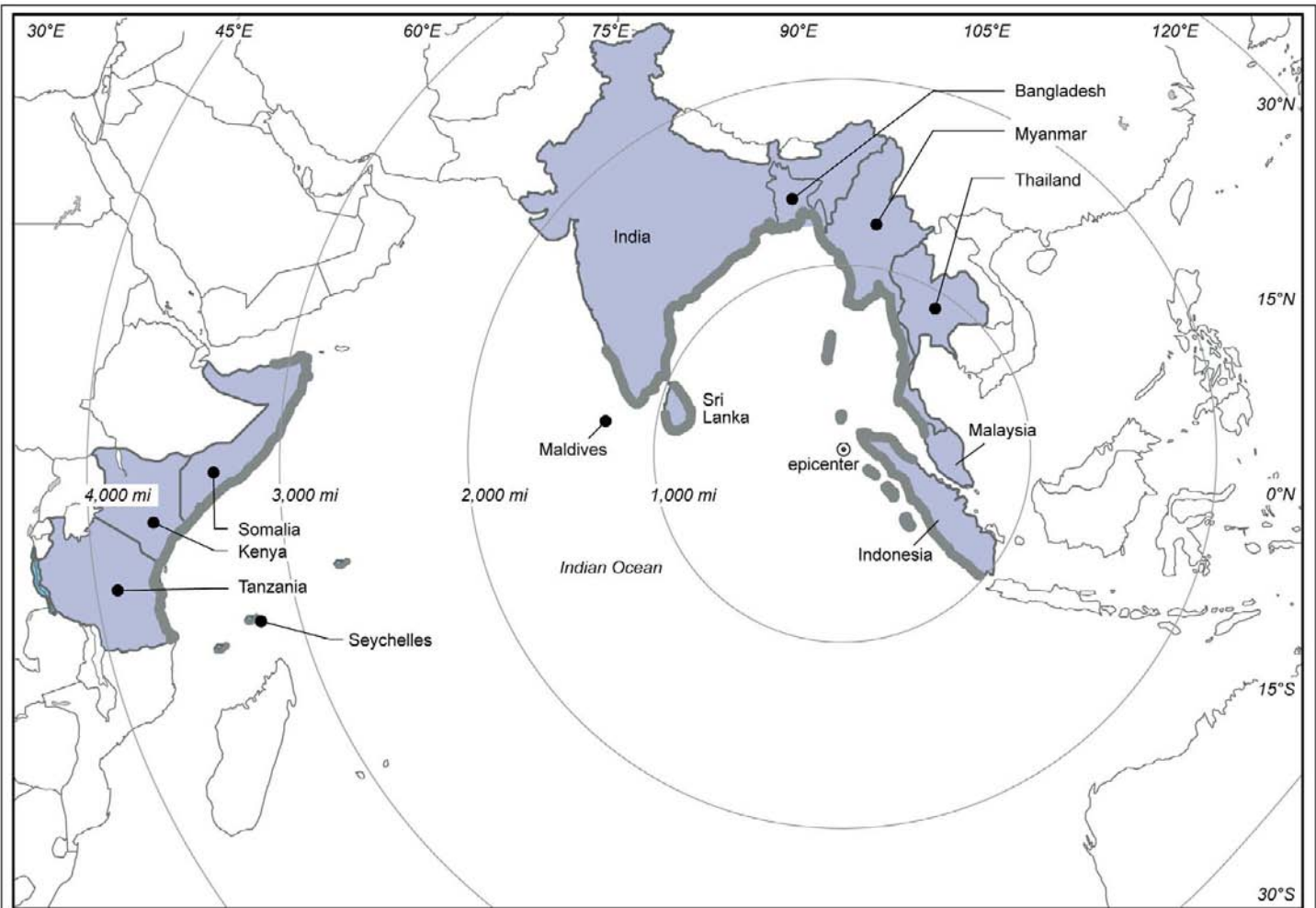
We conducted this performance audit from January 2012 to July 2012 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

The December 26, 2004, earthquake and tsunami in the Indian Ocean near Indonesia left more than 200,000 dead and 40,000 reported missing and caused an estimated \$10 billion in damages to property and infrastructure such as buildings, roads, and bridges. The Indonesian province of Aceh, about 150 miles from the epicenter of the earthquake, experienced the heaviest loss of lives and damage to property and infrastructure, largely along the west coast. Figure 1 shows the tsunami-affected countries; numbers of dead, missing, and displaced persons; and estimated damage.

⁵The Organization for Economic Cooperation and Development defines sustainability as the continuation of benefits from a development intervention (such as assets, skills, facilities, or improved services) after major development assistance has been completed.

Figure 1: Tsunami-Affected Countries; Numbers of Dead, Missing, and Displaced Persons; and Estimated Damage, as of November 2005



	Indonesia	All other affected countries ^a	Total
Dead/missing persons	169,000	62,452	231,452
Displaced persons	572,126	1,116,150+	1,738,276+
Estimated damage	\$4.5 billion	\$5.5 billion	\$10 billion

Sources: Map Resources (map); UN Office of the Special Envoy for Tsunami Recovery (affected countries and data).

^aSri Lanka was the second most affected country, with 35,322 dead or missing persons, 516,150 displaced persons, and \$1.5 billion in estimated damage.

In Indonesia, the affected infrastructure included a major road and numerous bridges along the west coast—a key transportation artery in the region—that was destroyed in many locations and severely damaged in many others. Figure 2 shows two of the destroyed road sections in December 2005, 1 year after the tsunami.

Figure 2: Destroyed Road Sections in December 2005, One Year after the Tsunami



Source: GAO.

We began monitoring USAID's delivery of assistance to the tsunami-affected countries, including its reconstruction of the Indonesian coastal road, in May 2005,⁶ and issued reports on our work in 2006 and 2007.⁷

- In April 2006, we reported that USAID planned to construct and rehabilitate 150 miles of paved road between Banda Aceh and Meulaboh at an estimated cost of \$245 million, or \$1.6 million per mile, with an estimated completion date of September 2009. We noted that the initial plans and cost estimates for rehabilitating and constructing the road were based on limited site information because much of the road's planned route was inaccessible. We also reported that costs and schedules for the road construction project might

⁶In March 2005, the House of Representatives Committee on Appropriations requested that we review U.S. assistance to the countries affected by the December 2004 earthquake and tsunami (H.R. Rep. 109-16, p. 49).

⁷[GAO-06-488](#) and [GAO-07-357](#).

exceed initial estimates owing to several factors,⁸ including growing costs for materials and labor, long-standing civil conflict in the region, and difficulties that the Indonesian government might encounter in acquiring land parcels needed for the road right-of-way.⁹

- In February 2007, we reported that USAID had reduced the planned scope of the road construction to 91 miles between Banda Aceh and Calang;¹⁰ increased its cost estimate to \$254 million, or \$2.7 million per mile;¹¹ and revised the project's estimated completion date to February 2010. USAID took these steps after more accurately determining the project's requirements and accounting for material and labor cost escalation.¹²

Of the \$908 million that Congress appropriated in May 2005 for tsunami relief, reconstruction, and related programs for affected countries in the region, \$349 million was budgeted to USAID for Indonesia reconstruction

⁸In our 2006 report, we recommended that, to help ensure the public availability of current information on the costs and schedules, the Secretary of State should provide updated cost and schedule estimates in the Department of State's semiannual report to Congress, required by the law providing the assistance (Pub. L. No. 109-13, §4102, May 11, 2005). State agreed with, and later implemented, our recommendations. See [GAO-06-488](#).

⁹Right-of-way denotes land or property acquired for transportation purposes. Obtaining land for right-of-way involves, among other activities, identifying the location of existing property boundaries, determining ownership, and acquiring parcels.

¹⁰The Japanese government agreed to rehabilitate the coastal road from Calang to Meulaboh.

¹¹Our report cited several factors that led to the revised scope, cost, and time frames, including USAID's receiving additional site information regarding the postdisaster environment and rising construction costs for materials and labor. See [GAO-07-357](#).

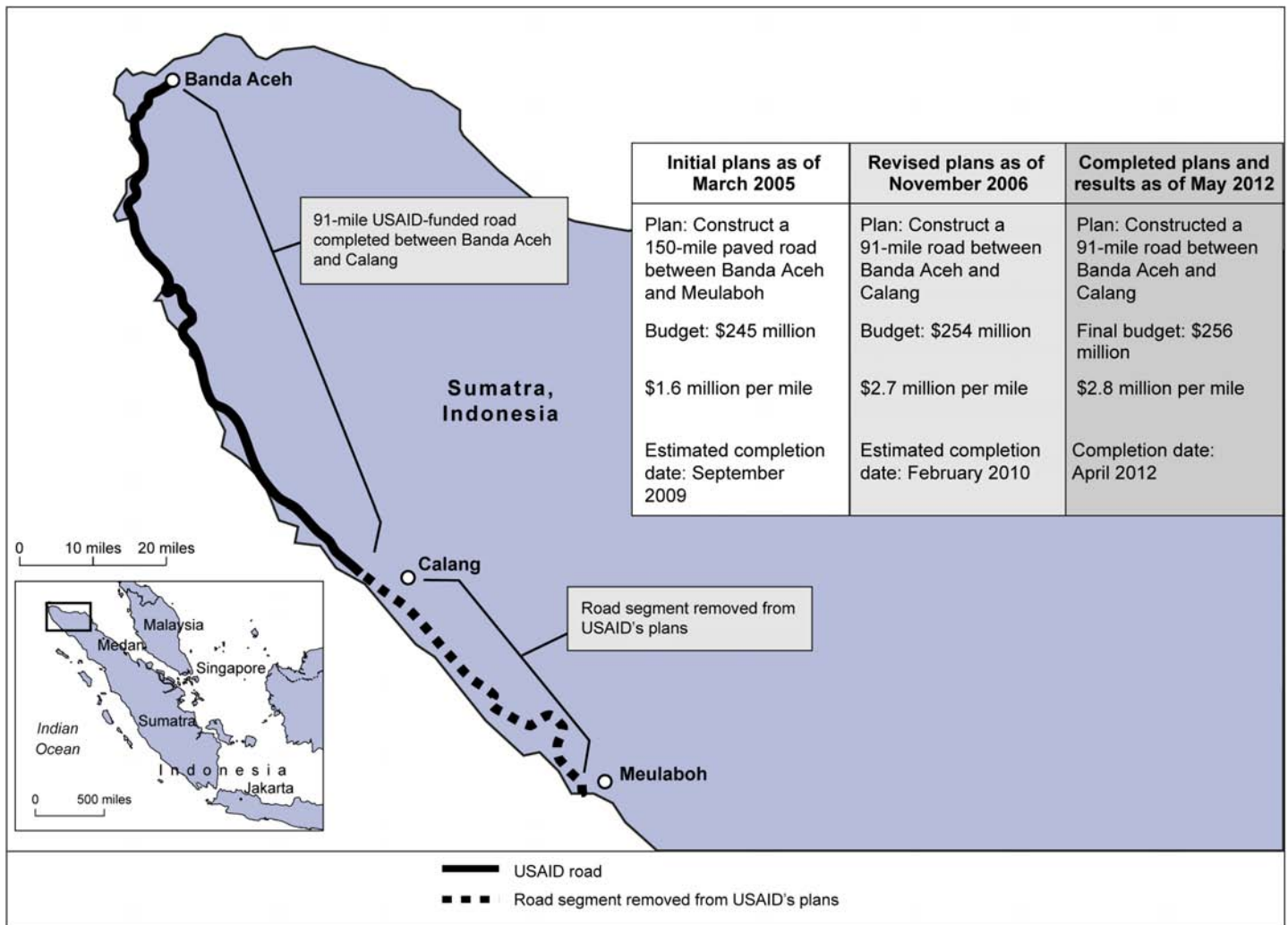
¹²In 2007, we also reported that, although State had included updated information in its periodic required reports to Congress, the reports did not clearly reflect USAID's progress in the programs or risks that could affect its progress and did not indicate ongoing risks that might impact projects' costs, schedules, and scopes of work. To ensure Congress's access to information that it needed to oversee USAID, we recommended that State's reports include certain funding information, identify factors that could impact USAID's implementation of the projects, and provide strategies for mitigating any impact. State agreed with, and later implemented, our recommendations. We also noted that several factors had contributed to increased cost and might lead USAID to further extend the completion date: the delayed award of a large-scale construction contract and, owing to the postdisaster environment, limited initial information on site conditions, rising construction costs, and difficulties in acquiring land for the road right-of-way. See [GAO-07-357](#).

activities. In 2005 USAID allocated \$245 million of this amount for the coastal road, and in 2006 USAID increased its allocation to \$254 million. USAID reported that the final estimated cost, as of July 2012, was \$256 million, or \$2.8 million per mile.¹³

Figure 3 shows USAID's initial and revised plans and completed results for the Indonesia coastal road.

¹³As of July 2012, USAID reported that it could not yet determine the final cost of the road because, among other things, a pending claim of \$2.3 million and a potential payment of value added tax of \$4.4 million were still outstanding.

Figure 3: USAID's Initial and Revised Plans and Completed Results for the Indonesia Coastal Road



Sources: GAO analysis of USAID data; Map Resources (inset map); and U.S. Army Corps of Engineers (map of Sumatra, Indonesia).

USAID Constructed Road under Several Major Contracts, with Numerous Factors Delaying Completion

From August 2005 to September 2010, USAID awarded five contracts to reconstruct the coastal road in Aceh Province, Indonesia—three contracts for construction, one contract for design and supervision, and one contract for project management. Factors related to contractor performance as well as local conditions delayed USAID’s progress in designing and constructing the road and led to increased costs.

Road Construction, Design and Supervision, and Project Management Were Performed under Five Contracts

Construction of the 91 miles of road completed in April 2012 took place under two contracts—designated by USAID as the “priority” and “prime” contracts—for a combined estimated 83 miles of the road, and under a third “8-mile” contract for the remaining 8 miles. USAID also awarded two additional contracts for, respectively, the design and supervision of the road construction and the management of the project.

- **Priority construction contract.** In August 2005, USAID awarded a contract to an Indonesia firm, PT Wijaya Karya (WIKA).¹⁴ Although initially expected to take place from August 2005 to August 2006, WIKA’s construction work did not begin until October 2006. To expedite construction on certain “priority” sections of the road, USAID modified the contract to include, among other things, expanding the scope from 3 miles to 26 miles and extending the completion date from August 2006 to December 2007 for the 26 miles. In May 2008, USAID partially terminated the priority contract, removing 8 miles from the contract’s scope.
- **Design and supervision contract.** In November 2005, USAID awarded a contract to Parsons Global Services (Parsons), a U.S.-based multinational engineering firm, to design most of the road sections—about 88 miles—and supervise construction of 91 miles of road work.
- **Project management contract.** In April 2006, approximately 6 months after hiring its design and supervision contractor, USAID hired a U.S.-registered professional engineer as its overall Project

¹⁴USAID initially awarded the contract to WIKA for repairing and maintaining 50 miles of existing road. Later, USAID amended the contract to also include designing and building a 3-mile road segment.

Manager¹⁵ for the road construction project. Parsons reported directly to the Project Manager. The Project Manager served as the project's chief technical officer; was USAID's principal interface with Indonesian government officials; advised in the development of the project's design and, to ensure its conformance with design specifications, inspected construction work and directed changes as required prior to road sections being turned over to the Indonesian government.

- **Prime construction contract.** In June 2007, USAID awarded the prime contract to SsangYong-Hutama Karya Joint Association (SsangYong-Hutama), a collaboration between a Korean firm and an Indonesian firm, for 65 miles of road construction in five noncontiguous sections. USAID had expected to award the prime construction contract in September 2006. However, its initial solicitation was restricted under USAID policy to U.S. firms, and USAID received only a single proposal, which the agency was unable to negotiate to an acceptable price.¹⁶ In December 2006, USAID issued a second solicitation that, in an approved deviation from USAID policy, was opened to international firms. According to USAID officials, the second solicitation attracted interest from several prospective offerors and included a revised estimated completion date of March 2010, 6 months later than originally planned.
- **Eight-mile construction contract.** In September 2010, USAID awarded a third construction contract to SsangYong Engineering & Construction (SsangYong) for the 8 contiguous miles removed from the priority contract, which was completed in January 2012.

Table 1 shows the five major contracts that USAID awarded for the construction, design and supervision, and overall project management of the 91-mile road, as well as the contractors' completed activities.

¹⁵USAID hired the Project Manager under a personal services contract in April 2006 but the Project Manager did not begin work until May 2006.

¹⁶USAID originally intended that the "prime" contract would be used to construct the majority of the originally planned 150-mile road. However, the inability to award the contract based on the initial solicitation caused USAID to both increase the scope of construction under the "priority" contract to 26 miles and reduce the scope of construction under the "prime" contract to 65 miles, reflecting the revised project goal of building a 91-mile road.

Table 1: Major USAID Contracts for Indonesia Road Construction, Design and Supervision, and Project Management, with Contractors' Completed Activities

Contract (month and year contract began) contractor	Comments	Completed activity		
		Overall project management	Design and supervision	Construction
Priority contract (August 2005) PT Wijaya Karya (WIKA)	Contract scoped to design and construct 3 miles of road Contract modified: 23 miles of road construction added. Contract partially terminated: 8 miles of road construction removed.	N/A	3 miles ^a (design)	3 miles 15 miles
Design and supervision contract (November 2005) Parsons Global Services	Contract awarded to design 88 miles of road and supervise construction of 91 miles of road.	N/A	88 miles ^a (design) 91 miles (supervision)	N/A
USAID Project Manager contract (April 2006) Personal services contractor	Contract awarded to provide overall project management.	91 miles		
Prime contract (June 2007) SsangYong-Hutama Joint Association	Contract awarded to construct 65 miles of road.	N/A	N/A	65 miles
8-mile contract (September 2010) SsangYong Engineering & Construction	Contract awarded to construct 8 miles of road that were removed from the priority contract.	N/A	N/A	8 miles
Total		91 miles	91 miles	91 miles

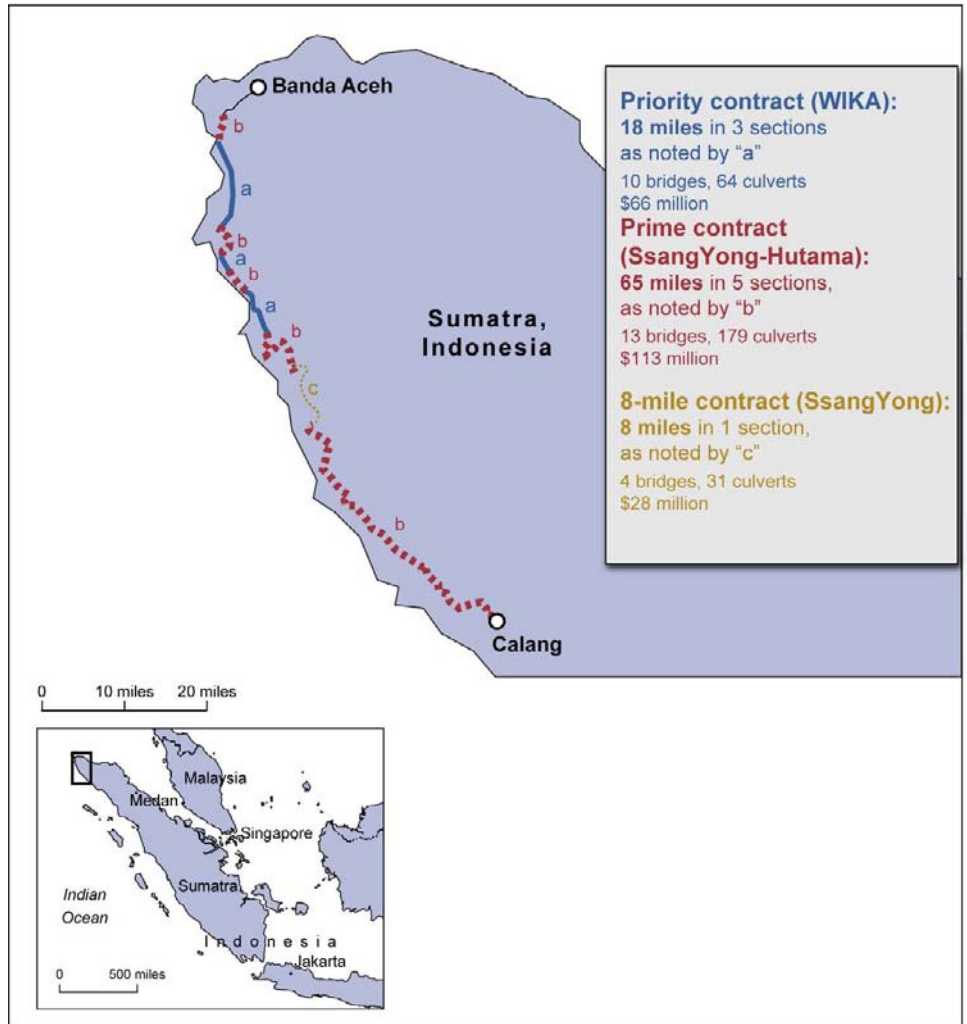
Legend: N/A = not applicable.

Source: GAO synthesis of USAID information.

^aWIKA designed the initial 3-mile "priority" road section; Parsons designed the remaining 88-mile road sections.

Figure 4 shows road sections, key features, and funding levels for each of the three road construction contractors.

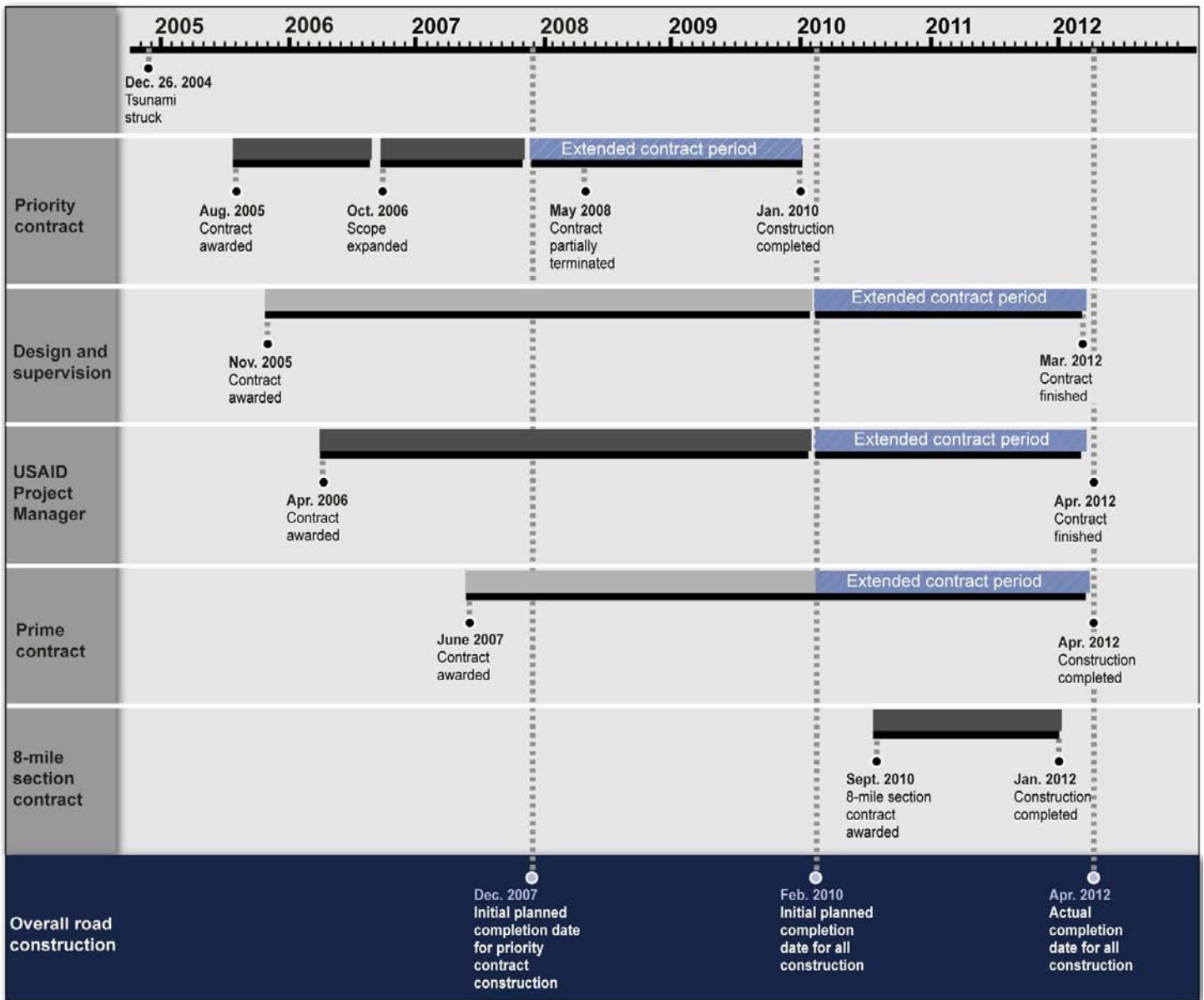
Figure 4: Indonesia Road Sections, Key Features, and Funding Levels for Three Construction Contractors



Sources: GAO analysis of USAID data; Map Resources (inset map); and U.S. Army Corps of Engineers (map of Sumatra, Indonesia).

Figure 5 shows a timeline of events related to the five contracts.

Figure 5: Timeline of Events Related to USAID's Five Major Contracts for Indonesia Road



Source: GAO analysis.

Several Factors Delayed Completion of Road Construction

Factors related to contractors' performance delayed USAID's progress in designing and constructing the road and led to increased costs.

- **Priority construction contractor.** Lack of acceptable progress by the priority contractor resulted in USAID's reducing the scope of the work, partially terminating the contract, and hiring a third construction contractor to complete the unfinished work. According to USAID, the mission determined that WIKA was not making satisfactory progress, owing in part to financial constraints and lack of equipment as well as WIKA's changing its project leader three times. WIKA's limited progress was primarily evident in one of the sections that comprised the priority contract. By May 2008, this 8-mile section was about 20 percent complete compared with other sections that were approximately 50 percent to 90 percent complete. Work in this section lagged in all areas of production including earthwork, concrete placement, and bridge and culvert construction. As a result, USAID eliminated this section from the scope of the priority contract through a termination action. USAID's decision to eliminate this section from the priority contract enabled WIKA to concentrate resources on remaining sections and continue making progress. USAID later awarded the 8-mile section to another contractor, SsangYong. However, because of the lengthy processes involved in terminating its contract with WIKA and procuring a new contract, USAID did not award its contract with SsangYong until September 2010.
- **Prime construction contractor.** Slower-than-expected progress, as well as the correction of work that did not comply with specifications, contributed to delays in the prime contractor's completion of the 65 miles of road construction. In addition, SsangYong-Hutama's project leader was changed five times, according to USAID, which may also have contributed to the contractor's repeatedly missing key schedule milestones.

In addition, several local factors affected construction progress and costs.

- **Delays in land acquisition.** According to USAID, the Indonesian government had difficulty acquiring over 4,000 parcels of land needed for the new road alignment and right-of-way. The land was needed because, in many areas, the tsunami had changed the entire landscape such that parts of the road alignment, as it existed prior to the tsunami, were now underwater or otherwise inaccessible or unusable. In its efforts to acquire the land parcels, the Indonesian government experienced delays in determining ownership and locating owners because many owners had died in the tsunami. Also,

in some instances, ownership documents, which were the only existing ownership records, were destroyed by the tsunami. Delays also occurred because, in some instances, the land parcels that were acquired were not contiguous and, as a result, construction contractors did not have a sufficient amount of land on which to initiate construction and store equipment and materials. For example, initiation of work to construct the priority 3-mile segment was delayed for approximately a year because the Indonesian government had acquired less than a quarter mile of right-of-way, significantly less land than USAID had expected to be available.

- **Community opposition.** Community opposition to the new road alignment resulted in delays, according to USAID. For example, construction was delayed because of disagreement between the Indonesian government and individuals and communities about the prices for land parcels. Also, for example, the proposed new alignment involved laying pavement over more than 600 gravesites. Upon learning that gravesites would be affected, some individuals and communities erected roadblocks and conducted demonstrations in opposition. To resolve the situation, Indonesian government officials, with USAID coordination assistance, had to negotiate settlements and identify and acquire new sites for the graves.
- **Security problems.** According to USAID, delays occurred because of security concerns and violence. For example, security threats caused delays in areas with a 30-year history of civil conflict between an insurgency group and the Indonesian government. Also, delays occurred when contractors received security threats, equipment was intentionally damaged, and workers were assaulted in land-value disputes. Figure 6 shows examples of community opposition that involved community protests, in some cases resulting in damage to contractor equipment.

Figure 6: Community Opposition to Indonesia Road Realignment, Involving Protests and Burned Equipment



Source: USAID.

Community opposition



Burned equipment

- **Flooding.** During construction, delays resulted from flooding, caused by unusually heavy rains that destroyed temporary access to construction sites and to construction facilities where materials and equipment were located. In some instances, according to USAID, roads flooded even though drainage culverts had been built according to design specifications (see fig. 7). Subsequent to this flooding, the contractor corrected inaccurate design assumptions, caused by a lack of reliable historical climatological data for the area, and increased the capacities of some culverts.

Figure 7: Flooding of Road Section Caused by Torrential Rains and Inaccurate Design



Source: USAID.

USAID Took Several Actions to Ensure Quality of Indonesia Road Design and Construction but Lacks Quality Assurance Mechanism for Sections Still under Warranty

USAID's actions to ensure the Indonesia road's quality included, among others, hiring an experienced project manager and requiring 1-year warranties for completed road sections. USAID also required that the road's design adhere to established quality standards and required inspections of road sections during and after construction. However, as of July 2012, USAID had not arranged for final inspections to ensure the quality of around 50 miles—about 55 percent—of the completed road that are still under warranty.

USAID Established Organizational and Operational Controls to Help Ensure Quality

To help ensure the quality of the road's design and construction, USAID established organizational and operational controls by contracting with experienced personnel for key management positions and including a 1-year warranty in each construction contract.

- **Project Manager.** In April 2006, USAID hired a U.S.-registered professional engineer as its Project Manager for the entire road construction project. The Project Manager had previous experience managing several USAID infrastructure projects overseas as well as managing regional operations with a U.S. state's department of transportation. The Project Manager served as the project's chief technical officer and USAID's principal interface with design/construction supervision and construction contractors and Indonesian government officials.
- **Design and supervision.** Approximately 6 months before hiring its Project Manager, USAID contracted with Parsons as the project's construction management contractor to complete the design of most of the road and manage the supervision of its construction.¹⁷ According to a Parsons official, USAID's hiring of a single firm to complete the design and management of construction supervision facilitated communication between design engineers and construction supervision staff and promoted quality in construction. USAID required that key Parsons design personnel have appropriate qualifications. For example, geotechnical, pavement, and structural designers were all required to be registered professional engineers with a minimum of 5 years experience on projects of a similar scope. In addition, USAID required that key Parsons' staff in Indonesia have certain qualifications, such as skills and experience in contract administration, inspection, and quality monitoring, to help ensure that the work complied with specifications and conformed to standard construction practices.
- **One-year warranty.** USAID included a 1-year warranty period in all of its contracts with construction firms. Specifically, for a period of 1 year after each road section is completed, the contractor is required to correct any poor-quality or faulty work that USAID or Parsons finds

¹⁷USAID awarded the contract to Parsons in November 2005.

during inspections.¹⁸ These sections are not formally turned over to the Indonesian government until the contractor completes the corrective actions, and contractors are not released from their responsibilities until the Indonesian government formally accepts the section of road.

USAID Required That Road Design Adhere to Established Quality Standards

To promote quality in the road's design, USAID required that Parsons adhere to established engineering standards.¹⁹ These standards define, among other things, key parameters such as lane and right-of-way widths, pavement structure, curve geometry, and weight-carrying capacity. To design pavement and bridge structures that would be capable of carrying anticipated vehicle loads, for example, design engineers used the widely accepted U.S. standards of the American Association of State Highway and Transportation Officials (AASHTO) as well as regionally and locally applicable Indonesian standards, such as those of the Association of Southeast Asian Nations. Use of AASHTO pavement design standards enabled engineers to determine the thickness of the road's layers (aggregate base layers covered with an asphalt surface) that would be needed to sustain anticipated traffic volumes and vehicle weights over its 10-year design life. In addition, use of AASHTO and Indonesian bridge standards allowed engineers to determine appropriate structural configurations for bridges in consideration of site-specific traffic, thermal, and seismic conditions.²⁰

Parsons also included several safety features in the design—for example, guardrails, warning signs, pavement markings, and protected walkways on bridges—that contributed to the road's quality. Figure 8 illustrates these features.

¹⁸Each of the road construction contracts consisted of multiple sections that were completed at different times. The warranty period for each of the sections is based on the time of its completion.

¹⁹The road's design was based on a combination of U.S., Asian, and country-specific Indonesian standards.

²⁰USAID also included planting mangrove trees, palms, ferns, and other native species to mitigate environmental impact.

Figure 8: Sections of Completed Indonesia Coastal Road



Source: GAO.
Warning signs



Source: USAID.
Pavement markings



Source: GAO.
Bridge walkway

USAID Provided Quality Assurance Oversight during and after Construction

During construction, USAID's Project Manager and Parsons took actions to help ensure quality by observing ongoing work, witnessing tests by construction contractors, conducting their own inspections, and requiring that the contractor correct any deficiencies or substandard work. For example, after determining that use of improper materials had resulted in the deterioration of approximately 6 miles of paved lanes, USAID directed the prime contractor to remove and replace these sections of the road.²¹ Parsons' staff were involved in performing daily quality tests and conducting inspections. Parsons provided information to USAID's Project Manager through frequent communication, correspondence, joint site reviews, and periodic reporting.

USAID's Project Manager and Parsons inspected road sections during construction, when construction was completed, and when the completed sections were handed over to the Indonesian government following the 1-year warranty period. Key project stakeholders—USAID's Project Manager, Parsons, the construction contractor, and Indonesian government officials—attended these inspections. When an inspection identified deficiencies, USAID and Parsons ensured that they were corrected before the road section was formally turned over to the Indonesian government. For example, during our March 2012 visit to

²¹The contractor replaced pavement in either one or both lanes along the road segment where USAID identified the use of improper materials.

Aceh Province, Indonesia, we observed one of the construction contractors repairing defective pavement that USAID's Project Manager had identified during an inspection near the end of the 1-year warranty for the affected section. Figure 9 shows a contractor using a milling machine to remove pavement on this section in preparation for corrective repaving.

Figure 9: Milling Machine Removing Faulty Pavement in Indonesia Road

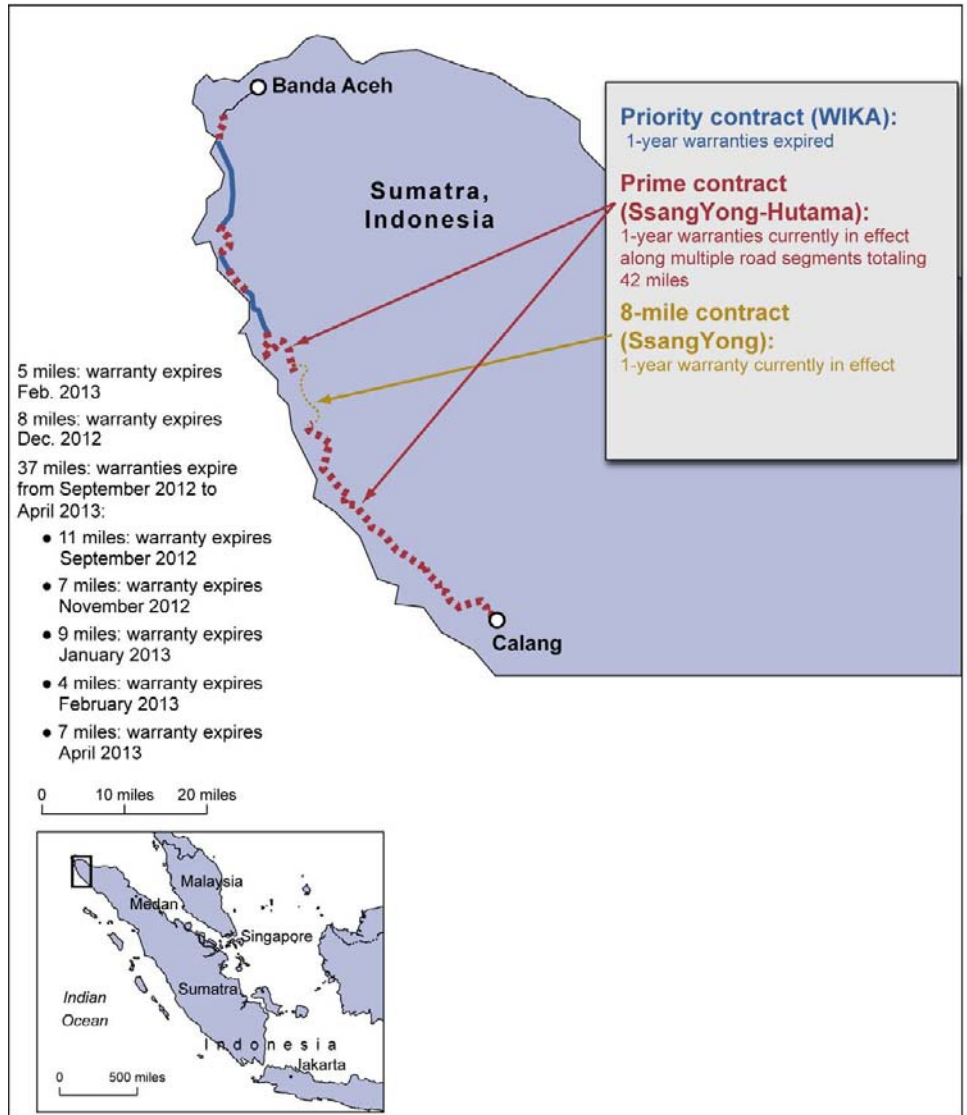


Source: GAO.

USAID Lacks Mechanism to Ensure Quality of Road Sections Still under One-Year Warranty

USAID currently lacks the capacity to ensure the quality of several sections of recently completed road that are still within the 1-year warranty period. Several sections totaling approximately 50 miles in length, or about 55 percent of the recently completed road, are currently under warranty—about 25 miles with warranties expiring at various times through the end of 2012 and about 25 miles with warranties expiring from January 2013 through April 2013. Figure 10 shows the locations of road sections with unexpired warranties, as of June 2012, and section expiration dates.

Figure 10: Indonesia Road Sections with Unexpired Warranties, and Section Expiration Dates



Sources: GAO analysis of USAID data; Map Resources (inset map); and U.S. Army Corps of Engineers (map of Sumatra, Indonesia).

Note: Distances of road segments comprising 37-mile prime contract section do not add to total due to rounding.

USAID officials in Jakarta told us in April 2012 that USAID was considering rehiring the former Project Manager on an intermittent basis to perform inspections of the approximately 50 miles of road sections

prior to expiration of the sections' 1-year warranties. However, as of July 2012, USAID had not yet reached an agreement with the Project Manager or made other arrangements to inspect the sections.

USAID Took Actions to Enhance Indonesia Road's Sustainability, but Several Factors Could Decrease Its Life Expectancy

To enhance the Indonesia road's sustainability, USAID designed and constructed it to withstand heavy weights, included in the design several features intended to minimize environmental impact, and provided assistance to the Indonesian Directorate General of Highways (the Directorate). However, several factors, such as the Directorate's limited capacity and resources and failure to restrict overweight vehicles, could lessen the road's sustainability during its intended 10-year life expectancy.

USAID Took Numerous Actions Intended to Enhance Road's Sustainability

USAID took several actions intended to enhance the road's sustainability for the intended 10-year life expectancy. For example, in designing and constructing the road, USAID anticipated the effects of heavy trucks—the most significant factor affecting the rate of pavement deterioration.²² USAID also included in the road's design the following features intended to enhance sustainability and minimize environmental impact:

- rock placement, known as armoring, along the shoreline to protect road from storm surges;
- shaped slopes and rock-fall retaining walls in mountainous areas to protect the road from damage;
- retainer and drainage systems to protect the road from rock falls and prevent flooding;
- concrete lining of drainage channels to prevent erosion;

²²According to AASHTO design standards, the amount of road deterioration caused by one 80,000-pound truck is equivalent to 24,000 cars. USAID's design contractor determined that the road would need to carry trucks weighing up to 100,000 pounds, a level that exceeds the 80,000-pound vehicle weight limit on the U.S. Interstate Highway System.

- slope stabilization using Gabion baskets;²³ and
- galvanized steel bridge structures that do not require periodic painting.

Figure 11 illustrates these features intended to enhance the road’s sustainability.

Figure 11: Features Intended to Enhance Sustainability of Indonesia Coastal Road

Armored embankment



Rock-fall retaining wall



Concrete-lined drainage channel



Slope stabilization



Water drainage system



Galvanized steel bridge



Sources: GAO and USAID.

Note: The slope stabilization shown was not included in USAID’s contract but was done in cooperation with the Indonesian government.

In addition, USAID’s Project Manager developed an operations and maintenance plan for the Directorate. The plan included recommended practices such as establishing road maintenance facilities and placing

²³Gabion baskets are rectangular containers fabricated of thick galvanized wire that are filled with stone and stacked on one another, usually in tiers that step back with the slope rather than vertically.

equipment at three locations to maintain the road, with specific maintenance responsibilities for each site. The plan also outlined necessary maintenance tasks, such as patching pavement, repairing guardrails, and cleaning culverts and drains, and it provided a checklist of equipment needed by the Directorate. Further, USAID's Project Manager suggested, among other things, that the Directorate limit the width and size of vehicles permitted to pass through narrow mountainous road sections. Figure 12 shows a truck passing through a narrow mountainous section of road that was repaved.

Figure 12: Truck on Narrow Mountainous Section of Indonesia Coastal Road



Source: GAO.

USAID also took other actions, such as employing local workers and donating used vehicles, that could enhance the road's sustainability. USAID encouraged contractors to employ Indonesian workers from Aceh Province during the construction work to enhance local skills and experience. For example, construction contractors employed Indonesian heavy equipment operators and truck drivers, and Parsons trained Indonesians to fill several key positions such as Finance Manager and

Public Information/Media Specialist. Also, according to USAID officials, after the construction work was completed, USAID and Parsons provided the Directorate with used vehicles for use in maintaining the road.

Several Factors Could Affect Road's Sustainability during Intended 10-Year Life Expectancy

Several factors—the Directorate's limited capacity and resources, failure to restrict overweight vehicles, construction in the road right-of-way, and unauthorized access roads—could lessen the road's sustainability for its intended 10-year life expectancy.

- **Limited capacity and resources.** Although the Directorate has provided a 5-year funding plan for the road and taken some actions to replace missing guardrails, the Directorate lacks some equipment as well as a sufficient number of staff for maintenance and repairs, according to USAID and Directorate officials. For example, USAID recommended in its checklist that the Directorate keep a jackhammer, compressor, and four vibrator rollers at each of three proposed maintenance facilities, but as of May 2012, the Directorate had not established the maintenance facilities and had not provided the equipment. Also, according to Directorate officials in Banda Aceh, the Directorate has a limited number of staff to maintain existing roads throughout Aceh Province.
- **Overweight vehicles.** The Directorate has not taken action to restrict the use of overweight vehicles on the road, which could reduce the road's life expectancy. USAID's design of the road with a 10-year life expectancy is based on certain assumptions concerning the impact of the number and weight of vehicles on the road's deterioration. For example, USAID's design assumes that the heaviest trucks anticipated (100,000-pound, 3-axle trucks) on the road will comprise less than 1 percent of total traffic; however, this low volume of heavy truck traffic will cause more than 60 percent of the road's deterioration over its 10-year design life. A greater than expected volume of heavy truck traffic, or use of the road by trucks that exceed 100,000 pounds, will lead to a higher amount of deterioration and reduced life for the road. To thwart acceleration of pavement damage resulting from overweight vehicles using the road, USAID recommended that the Directorate use portable scales to weigh suspected overweight vehicles. However, as of May 2012, the Directorate had not taken any actions to weigh vehicles. During our March 2012 inspection of the road, we observed several heavily loaded trucks but saw no permanent weigh stations and saw no vehicles being weighed with portable scales.

-
- **Construction in right-of-way.** The road's intended 10-year life expectancy is also based on keeping drainage culverts in the right-of-way clear of blockage, according to USAID's Project Manager. However, the Directorate has not taken action to prevent the construction of buildings and has not removed existing buildings that have been constructed in the right-of-way. Such construction could obstruct drainage channels and cause erosion and flooding. According to USAID officials, USAID informed the Directorate of numerous instances where buildings had been or were being constructed in the right-of-way, but as of May 2012, the Indonesian government had not taken any actions to remove or prevent such construction. When we traveled the length of the road in March 2012, we observed a completed building that had been constructed in the right-of-way over the drainage channel.
 - **Unauthorized access roads.** As of March 2012, according to USAID's Project Manager, the Directorate had not taken action to prevent the creation of unauthorized access roads, which also can prevent proper drainage and cause erosion and flooding. These unauthorized access roads have been constructed by removing guardrail or moving soil, rocks, and other materials; in some instances, these access roads may obstruct drainage channels and cause erosion and flooding. During our March 2012 inspection of the road, we saw several access roads that had been built by removing guardrails and moving soil and other materials.

Figure 13 shows a building that was constructed in the right-of-way and an unauthorized access road where the guardrail was removed.

Figure 13: Building Constructed in Right-of-Way (left) and Unauthorized Access Road and Removed Guardrail (right)



Source: GAO.

Building constructed in right-of-way



Unauthorized access road and removed guardrail

Conclusions

USAID has completed the construction of a major 91-mile road in a coastal area of northern Indonesia that was heavily affected by the December 2004 tsunami and, in doing so, has helped to provide an opportunity for economic growth in the region. Although USAID completed the road construction more than 2 years later than planned, the agency finished the work by confronting and overcoming significant obstacles while working in a challenging environment. However, despite taking several actions to help ensure the road's quality, USAID currently lacks the capacity to ensure that approximately 50 miles of recently completed road sections—55 percent of the entire road—still under warranty perform as intended through the 1-year warranty period, as stipulated in USAID's contracts with construction firms. Specifically, although USAID officials in Jakarta told us that they are considering rehiring the Project Manager on an interim contract, the agency has not finalized this arrangement. Without qualified personnel inspecting these road sections before their warranties expire, USAID cannot ensure that the quality standards are met and that the contractor corrects any deficiencies as required within the 1-year warranty period.

To help ensure that the road will reach its intended 10-year life expectancy, USAID took actions such as designing the road in accordance with established standards and supporting the Indonesian government's Directorate for Highways. However, the road may not achieve its 10-year life expectancy unless the Indonesian government properly maintains the road, restricts usage by overweight vehicles, and prevents construction in the road right-of-way and creation of unauthorized access roads.

Recommendations for Executive Action

We recommend that the Administrator of USAID take the following two actions:

- To help ensure that recently completed sections of the Indonesia road meet quality standards as required during the 1-year warranty period, ensure that the road sections are inspected in a timely manner and, if deficiencies are found, require that the construction contractor repair the sections before they are formally turned over to the Indonesian government.
- To help ensure that the constructed road remains sustainable for 10 years as intended, direct the USAID Mission in Indonesia to work with the Indonesian government to develop and implement a process addressing factors that could affect the road's sustainability.

Agency Comments and Our Evaluation

We provided a draft of this report, as well as a video of our March 2012 inspection of the road, to USAID and State for their review. USAID provided written comments about the draft report, which are reprinted in appendix II, and provided technical comments about the draft report and the video that we incorporated as appropriate. State did not provide comments on either the draft report or the video.

In its written comments, USAID stated that our report presented an accurate assessment of its construction operations and its efforts to ensure the road's quality and sustainability. In addition, USAID concurred with our recommendation that it ensure that road sections still under warranty are inspected in a timely manner and that it require the contractor to repair any defective sections. The agency stated that it will retain qualified personnel who can perform inspections before the warranties expire. USAID concurred with the intent of our recommendation that, to help ensure the road's sustainability for the intended 10 years, it should work with the Indonesian government to develop and implement a process addressing factors that could affect the road's sustainability. USAID noted that many of the factors that could affect the road's sustainability are outside the agency's managerial control and that, apart from the road sections still under warranty, the road is under the Indonesian government's administration. USAID indicated that any additional technical assistance it might offer the Indonesian government would be contingent on the government's receptiveness as well as the availability of USAID resources. We maintain that it is essential that USAID work proactively with the Indonesian government to develop and implement a process that addresses certain

factors, such as the use of overweight vehicles, construction in the right-of-way, and the creation of unauthorized access roads, that could affect the road's sustainability.

We are sending copies of this report to interested congressional committees, the Secretary of State, and the USAID Administrator. We will also provide copies to others on request. In addition, the report is available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-3149 or gootnickd@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix III.

A handwritten signature in black ink, appearing to read "David Gootnick". The signature is stylized with a large, looping initial "D" and a cursive "Gootnick".

David Gootnick
Director, International Affairs and Trade

Appendix I: Scope and Methodology

We reviewed the 91-mile road constructed by the U.S. Agency for International Development (USAID) in Aceh Province, Indonesia, following the December 2004 tsunami. This is the third report we have conducted on USAID's post-tsunami reconstruction efforts. Our objectives in this report were to (1) describe USAID's road construction operations as well as factors that delayed the road's completion, (2) assess USAID efforts to ensure the road's quality, and (3) examine factors that could affect the road's sustainability.

To determine the status and funding of USAID's road reconstruction activities in Aceh Province, Indonesia, we reviewed documents and interviewed officials from USAID's Bureau for Asia and the Near East and the Department of State's (State) Office of Foreign Assistance Resources in Washington, D.C.; and USAID's Office of Financial Management at its mission in Jakarta, Indonesia. We obtained information from USAID officials on internal controls for collection of data, reviewed consolidated reports and mission-specific reports, and interviewed cognizant officials at USAID and State about data reliability. In addition, we interviewed knowledgeable USAID officials about the systems and methodology they use to verify the completeness and accuracy of the data. We determined that the data were sufficiently reliable for the purposes of our report.

To assess the reliability of USAID and State funding and expenditure data, we reviewed USAID Office of the Inspector General and previous GAO reports on USAID disaster reconstruction programs and funding since 2002; we found that none of these sources noted any discrepancies or concerns about the reliability of USAID's data. Based on our comparison of data generated from various USAID and State sources, we found that the sources generally corroborated each other. We determined that USAID and State funding and expenditure data were sufficiently reliable for our report.

To assess the quality, construction features, and sustainability of the road construction, we traveled the full 91-mile length of the road from Banda Aceh to Calang, Indonesia, with USAID's Project Manager for the road construction project. We also traveled the road from Calang to Meulaboh, Indonesia, for comparative purposes. During our trip between Banda Aceh and Calang, we photographed and recorded video of several road

construction features and activities, and recorded testimony¹ from USAID's Project Manager on construction features, obstacles, challenges, quality, and potential impediments to sustainability. In Banda Aceh, we met with representatives from the Indonesian Directorate General of Highways (the Directorate), which is responsible for maintaining the road. To better understand construction, quality, potential obstacles to sustainability, and general construction challenges, we met with representatives of both SsangYong and Hutama, the two firms that constitute the SsangYong-Hutama Joint Association.

To identify obstacles that USAID encountered, we examined USAID Office of Inspector General and State reports which provide information on construction status as well as summarize major construction accomplishments and challenges. In Jakarta, Indonesia, we met with representatives from the Directorate. We also reviewed USAID road construction files to better understand the obstacles that led to delays and cost increases; this review included reviewing status reports, contracts, and correspondence.

To examine the extent to which USAID ensured quality, we reviewed USAID road construction contracts and met with USAID's Project Manager to discuss oversight procedures. We also discussed USAID's road quality inspections and procedures for ensuring that construction contractors make repairs to damaged sections of road within the 1-year warranty period, as required. Members of our staff, including a U.S.-registered professional engineer, traveled the road and examined road quality through direct observation of road conditions, construction features, and repair work being performed.

To examine the extent to which USAID helped ensure sustainability, we examined road operations and maintenance plans developed by USAID for the Directorate, which included practices that the USAID Project Manager recommended that the Directorate adopt and implement. We also examined the checklist of equipment developed by USAID's Project Manager and needed by the Directorate to maintain the road. Members of our staff, including a U.S.-registered professional engineer, made direct

¹View a video of our March 2012 inspection of the road.
http://www.gao.gov/multimedia/video#video_id=592299.

observations of road features that were designed and constructed for road sustainability.

We conducted this performance audit from January 2012 to July 2012 in accordance with generally accepted government auditing standards. These standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Comments from the U.S. Agency for International Development

Note: GAO received USAID's letter on July 9, 2012.



David Gootnick
Director, International Affairs and Trade
Government Accountability Office
Washington, DC 20548

Dear Mr. Gootnick:

I am pleased to provide the formal response to the Government Accountability Office (GAO) draft report entitled "FOREIGN ASSISTANCE: Actions Needed to Help Ensure Quality and Sustainability of USAID Road in Indonesia"- GAO-12-728 for the U.S. Agency for International Development (USAID).

The enclosed USAID comments are provided for incorporation with this letter as an appendix to the final report.

Thank you for the opportunity to respond to the GAO draft report and for the courtesies extended by your staff in the conduct of this audit review.

Sincerely,

A handwritten signature in black ink, appearing to read "Angelique M. Crumbly". The signature is fluid and cursive, written over a light blue horizontal line.

Angelique M. Crumbly
Acting Assistant to the Administrator
Bureau for Management
U.S. Agency for International Development

Enclosure: a/s

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**USAID COMMENTS ON GAO DRAFT REPORT FOREIGN ASSISTANCE: Actions
Needed to Help Ensure Quality and Sustainability of USAID Road in Indonesia
(GAO-12-728)**

USAID's Aceh Road Reconstruction Project is the key and final component of USAID's \$405.7 million Tsunami Recovery and Reconstruction in Indonesia Program, funded as part of the Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Tsunami Relief 2005. The road is essential to Aceh's recovery from the 2004 tsunami and its continuing reintegration into Indonesia following years of conflict. It will ensure mobility, improve communications, and facilitate trade and job creation in northern Sumatra. It is expected to be a key driver in generating economic growth in Aceh's neglected western coast, which was the worst hit area in the 2004 tsunami. The new road will sharply reduce transit times and prices for bringing farm and fishery goods to market, benefiting thousands in the three districts bordering the road. It will also help connect inland and coastal communities and the province of North Sumatra to the major urban centers of Aceh.

USAID considers the completion of this major asset for the region, despite a challenging environment and multiple significant obstacles, a noteworthy accomplishment. In addition, the people in Aceh are pleased to have this road rebuilt with the assistance of the U.S. government and it has made a positive impact on their lives.

USAID finds the report generally fair and presents an accurate assessment of the construction operations and efforts to ensure road quality and sustainability. We thank GAO for its cooperation and the time and effort spent during January 2012 to July 2012 gaining a sound understanding of the complex "USAID Road in Indonesia" project.

Recommendation 1: To ensure that recently completed sections of the Indonesia road meet quality standards as required during the 1-year warranty period, we recommend that the Administrator of USAID ensure that the road sections are inspected in a timely manner and, if deficiencies are found, require that the construction contractor repair the sections before they are formally turned over to the Indonesian government.

Management Comment:

USAID concurs with GAO recommendation for ensuring that road sections currently under warranty be inspected in a timely manner by skilled professionals. If deficiencies are found, the contractor will be required to repair the sections before they are formally handed over to the Government of Indonesia (GOI). To achieve this objective, the USAID Mission in Indonesia will employ the most effective and efficient manner to retain qualified personnel who can inspect the roads before the warranties expire. The USAID Mission is already looking at the prospect of using the former USAID Aceh Road Project Manager on an intermittent basis to perform inspections. The Mission is concurrently looking at other possible options for adequate oversight.

Recommendation 2: To help ensure that the constructed road remains sustainable for 10 years as intended, we recommend that the Administrator of USAID direct the USAID Mission in

- 3 -

Indonesia to work with the Indonesian government to develop and implement a process addressing factors that could affect the road's sustainability.

Management Comment:

USAID concurs with the intent of recommendation 2; however, the Indonesia Mission cannot assure that the Indonesian government develops and implements a process to achieve the road's sustainability during the intended 10-year life expectancy. It is important to note that many of the factors in the report that could possibly affect the road's sustainability during the intended 10-year life expectancy are outside of USAID's managerial control. With exception to the sections still under warranty, the road is under GOI administration. GOI receptiveness to additional technical assistance on the road will be gauged. Understanding it to be a demand-driven process, USAID will engage the appropriate officials on how additional technical assistance could best enhance Aceh road sustainability efforts. Results will be contingent on those discussions and availability of USAID resources to meet those demands.

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

David Gootnick, (202) 512-3149 or gootnickd@gao.gov

Staff Acknowledgments

In addition to the contact named above, Emil Friberg, Jr. (Assistant Director), Michael Armes (Assistant Director, registered Professional Engineer), Ryan Barlow, Mason Calhoun, Reid Lowe, and George Taylor made key contributions to this report. Ashley Alley, Martin De Alteriis, Theresa Perkins, Jeremy Sebest, Jena Sinkfield, and Cynthia Taylor provided technical assistance.

Related GAO Products

Haiti Reconstruction: Factors Contributing to Delays in USAID Infrastructure Construction. [GAO-12-68](#). Washington, D.C.: November 16, 2011.

Haiti Reconstruction: U.S. Efforts Have Begun, Expanded Oversight Still to Be Implemented. [GAO-11-415](#). Washington, D.C.: May 19, 2011.

Afghanistan Reconstruction: Progress Made in Constructing Roads, but Assessments for Determining Impact and a Sustainable Maintenance Program Are Needed. [GAO-08-689](#). Washington, D.C.: July 8, 2008.

Compact of Free Association: Palau's Use of and Accountability for U.S. Assistance and Prospects for Economic Self-Sufficiency. [GAO-08-732](#). Washington, D.C.: June 10, 2008.

Foreign Assistance: USAID Signature Tsunami Reconstruction Efforts in Indonesia and Sri Lanka Exceed Initial Cost and Schedule Estimates, and Face Further Risks. [GAO-07-357](#). Washington, D.C.: February 27, 2007.

Foreign Assistance: USAID Completed Many Caribbean Disaster Recovery Activities, but Several Challenges Hampered Efforts. [GAO-06-645](#). Washington, D.C.: May 26, 2006.

Foreign Assistance: USAID Has Begun Tsunami Reconstruction in Indonesia and Sri Lanka, but Key Projects May Exceed Initial Cost and Schedule Estimates. [GAO-06-488](#). Washington, D.C.: April 14, 2006.

Foreign Assistance: USAID's Earthquake Recovery Program in El Salvador Has Made Progress, but Key Activities Are Behind Schedule. [GAO-03-656](#). Washington, D.C.: May 15, 2003.

Foreign Assistance: Disaster Recovery Program Addressed Intended Purposes, but USAID Needs Greater Flexibility to Improve Response Capability. [GAO-02-787](#). Washington, D.C.: July 24, 2002.

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